Robert Fulton and The Clermont

Alice Crary Sutcliffe

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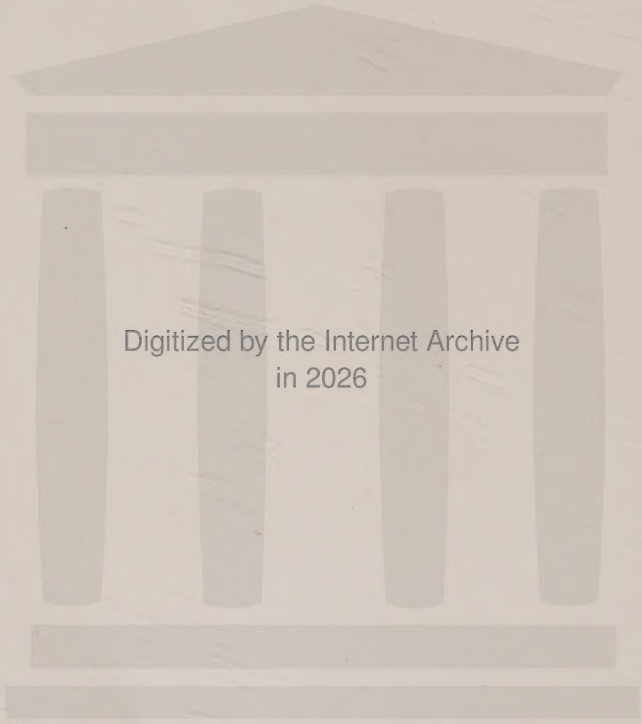
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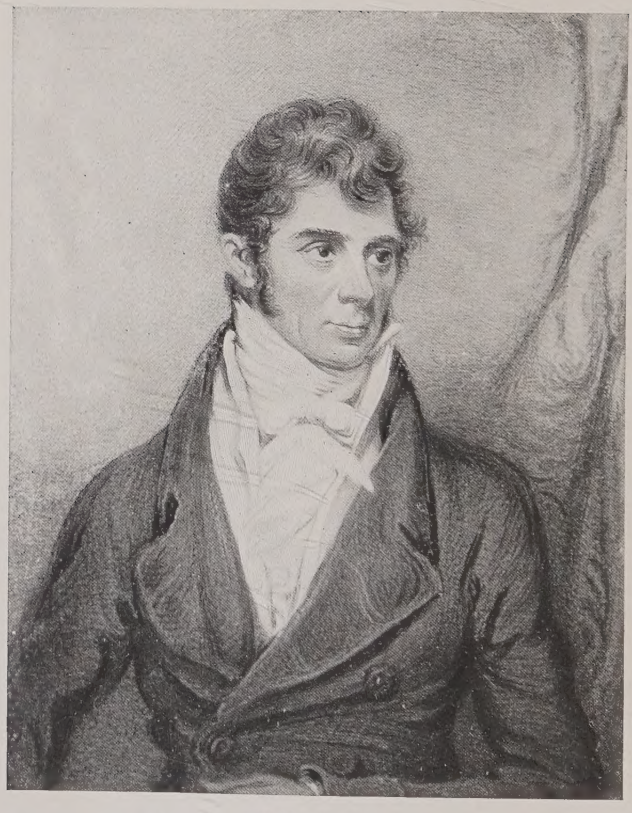

ROBERT FULTON

From the original miniature owned by C. Franklin Crary, grandson of Robert Fulton. Never before reproduced

ROBERT FULTON AND THE "CLERMONT"

THE AUTHORITATIVE STORY OF
ROBERT FULTON'S EARLY EXPERIMENTS, PERSISTENT
EFFORTS, AND HISTORIC ACHIEVEMENTS.
CONTAINING MANY OF FULTON'S
HITHERTO UNPUBLISHED
LETTERS, DRAWINGS,
AND PICTURES

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BY

ALICE CRARY SUTCLIFFE

GREAT-GRANDDAUGHTER OF THE INVENTOR

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THIS VOLUME IS AFFECTIONATELY DEDICATED
TO MY FATHER

THE REVEREND ROBERT FULTON CRARY, D.D.
(ELDEST GRANDSON OF ROBERT FULTON)

FOR FORTY YEARS RECTOR OF THE CHURCH OF THE
HOLY COMFORTER, POUGHKEEPSIE, NEW YORK,
WHOSE SERVICES THROUGHOUT LIFE,
NO LESS DEVOTED THAN THOSE OF
HIS ILLUSTRIOUS ANCESTOR, HAVE
BEEN IN THE GREAT NAVY
OF THE CHURCH OF GOD

PREFACE

An explanation seems necessary for doing again a deed already well done. Several biographies of Robert Fulton have been written: Cadwallader D. Colden, James Renwick, J. F. Reigart, Robert H. Thurston, Thomas W. Knox, and Peyton F. Miller have successively interpreted the life of the inventor, and to them I would acknowledge a debt of interest and illumination. But in no volume can be found so full a quota of Robert Fulton's own descriptive plans for his inventions as are here presented. During a research extending over three years I have been able to transcribe many of Fulton's unique and original

records, and to secure reproductions of interesting portraits of or by him.

For access to these manuscripts and pictures, or for copies of them, I am indebted to the estate of Fulton's daughter, Cornelia Livingston Crary; to Mrs. Robert Fulton Blight; to Mr. R. Fulton Ludlow; to Judge Peter T. Barlow; to John Henry Livingston, Esq., of Clermont; to Earl Stanhope of England; to Mr. H. Harrison Suplee, Editor of "Cassier's Magazine"; to Mr. S. W. Stanton, Editor of "The Nautical Gazette"; to J. Eliot Hodgkin, F.S.A., of London, England; to Mr. Frank E. Kirby, Naval Architect; to Mr. E. C. Eldridge of Paris, France; to Mr. C. H. Hart, Mrs. C. S. Bradford, Miss Elizabeth G. Sparks, Mrs. Joseph Drexel, and Mrs. McHenry, of Philadel-

phia; to Mr. H. A. Boardman of St. Paul, Minnesota; to Dr. Thomas Addis Emmet of New York; to Mr. Charles Burr Todd, biographer of Joel Barlow; to Mr. Joseph Swift of Little Britain, Pennsylvania; to the Misses Vinton of Pomfret, Connecticut; to Mr. R. Livingston Jenkins, Mr. J. Seymour Bullock, Mr. Edward Bringhurst, Rev. Wm. B. Gilpin, Mr. W. U. Hensel, Mr. Henry B. Bayer, Mrs. E. Harrison Sanford; J. H. Leamont, Esq., of Montreal; Mr. Herman Livingston of Catskill; and to the authorities of the Lenox Library, the Library of Congress, the Boston Public Library, the Historical Societies of New York, Pennsylvania, New Jersey, and Chicago; the National Academy of Design; the Pennsylvania Academy of Fine Arts; the British Museum;

the Society of Mechanical Engineers, New York; Haverford College and Columbia University.

Robert Fulton anticipated the enlightenment of this century. He emphasized truths which prevail to-day and are termed modern: a hope for Universal Peace; a claim for Intellectual Freedom through a system of general, free education; a discernment that a Nation's wealth is the sum of the talents and handiworks of its citizens; and a sacrifice of any personal claim to leisure that through labor a world might be served;—these were the ruling motives of his life.

He was an artist with unbounded delight in the glories of color and form; he was an engineer and inventor, with patience developing a knowledge of un-

known powers awaiting human control; he was, through all, an American statesman who, although he lived for years amidst the cultivation and advanced intellectual attainment of France and England, was glad to return to his native land to demonstrate the truth of his final discovery in science and to launch his first steamboat upon the waters of the New World.

If it be true that Fulton lived one hundred years before his time, the centennial of his achievement fulfils the span necessary for human recognition; and America will welcome the recital of the purposes of his life in these original papers which portray, not solely his inventions, but his spirit of true liberty.

ALICE CRARY SUTCLIFFE.

PART I
EARLY LIFE

ROBERT FULTON AND THE "CLERMONT"

ROBERT FULTON was born at Little Britain, Lancaster County, Pennsylvania, November 14, 1765. Previous biographers have called him "a self-made man," and have made brief allusion to his parentage. It is noteworthy that his father, the senior Robert Fulton, in a failure to leave financial patrimony to his children, has not been accorded the mention of other achievements, not slight in those primitive days. His ancestors were of Saxon origin, having crossed from Scotland to Ireland at an early date. From Kilkenny, the Fulton family came

to America before the year 1735. The senior Robert Fulton was among the prominent men of Lancaster, his name having been on record upon all the town organizations which existed at that period.[1] He married Miss Mary Smith, a sister of Colonel Robert Smith of Chester County. They were the children of Joseph Smith of Oxford township, Pennsylvania, whose will, dated May 22, 1760, bequeathed "To my beloved Daughter, Mary, wife of Robert Fulton, the sum of Five Pounds, to be levied off my Estate."

On August 23, 1759, the elder Robert Fulton bought the brick dwelling-house on the northeast corner of Penn Square, afterward known as Center Square, in the town of Lancaster. Two children,

[1] He was a founder of the Presbyterian church, the Secretary of the Union Fire Company, and a charter member of the Juliana Library of Lancaster, the third library established in the American Colonies. (1763).

FARM-HOUSE AT LITTLE BRITAIN, PENNSYLVANIA, THE BIRTHPLACE OF ROBERT FULTON

LIBRARY

daughters, were born in this house, and Mr. and Mrs. Fulton lived there until 1765. On November 8, 1764, he purchased a farm of 393¾ acres, situated on the Conowingo Creek, in Little Britain township, and during the following spring moved his family to the farm-house which is still standing at the country cross-roads. There Robert Fulton the inventor was born.

In 1844 the township of Little Britain was resurveyed, and a new section was set aside, to be known as "Fulton Township," in honor of the child who lived for the first few months of his eventful life within its quiet borders. The farm-house which sheltered his infancy was built of plastered stone, two stories high, and at one end the roof sloped to a low porch.

Robert Fulton's father was not a successful farmer; perchance he yearned

for the companionship of his Lancaster friends. One thing is certain: during the following year he and his wife mortgaged the property, and moved back to the town of Lancaster.

Not long ago the present owner rebuilt the house and the old section of the homestead was encompassed by the new. The two parlors, low-ceiled and broad, remain; and in one of these rooms, formerly the kitchen, the original fireplace is intact, the crane still swinging within the sooted inclosure where Robert Fulton's father laid the logs so many years ago. Above the parlor is the room where the inventor was born. Only the broad window-sills show age; the remainder of the house is placidly and emphatically modern.

Joseph Swift, a cousin of Robert Fulton, in writing years ago from Philadelphia, said that his grandfather well

remembered in his youth "the great preparations which a visit to Aunt Fulton required in the way of baking, boiling, and roasting, and in getting ready the camp equipage which the journey through the wilderness required. It was only less formidable than a journey across the Atlantic."

FRIENDSHIP WITH THE FAMILY OF WEST

The father of the celebrated artist Benjamin West lived in the adjoining county of Chester, and was an intimate friend of the senior Robert Fulton. The interesting portraits of Mr. and Mrs. Fulton, here for the first time reproduced, have unique value, in that they are among the earliest known works of the young artist, who later attained distinction as President of the Royal Academy

of London. At the age of twelve years, West had gained local fame as an artist, and was invited to visit Lancaster to paint the portraits of Mrs. Ross and her children, famous beauties of the day. The father's permission was obtained, and West came to Lancaster, and executed his task with such a degree of success that he could with difficulty find time to fill the orders which poured in upon him. It is recorded that he received his first payment in exchange for drawings made on poplar boards, and that he for some time continued to paint portraits in Lancaster. The Fulton portraits were found many years ago in the attic of an old house in Lancaster County, and were thought by the owner to be representations of the inventor and his wife. This is manifestly impossible, not only from their lack of resemblance to other authenticated portraits, but also because

of the discrepancy in the date of the signature, which is "B. West 175–," the last figure being indistinct. It is therefore concluded that they are the only known representations of the father and mother of the inventor. The daily sight of these portraits in his home, and the knowledge of the success of his energetic young neighbor Benjamin West, may have proved the inspiration of Robert Fulton's subsequent study and love of art.

In 1756, Benjamin West's mother died, and he went to reside in Philadelphia, although it is probable that he frequently returned for visits in Lancaster. It is known that he painted signs for local taverns, and some of these have been preserved by collectors. In Philadelphia he gained reputation as an artist, and an increased patronage. For his portraits, at this time, he received two and a half

guineas for a head, and five guineas for a half-length. Desirous to increase his prices, he went to New York for a period of eleven months, where he executed many portraits.

The elder Robert Fulton was an ardent Presbyterian. A letter from Edward Burd of Philadelphia to William Rawle, published in the "Pennsylvanian Magazine," concludes with these words: "Having lived in Lancaster till I was eleven years of age, I recollect that the father of the famous Robert Fulton, who had a sonorous and stentorian voice, used to raise the Psalm in the Court House, where Presbyterians occasionally preached." He was one of the founders of the First Presbyterian Church in Lancaster. His death occurred in 1768.

In Delaplaine's "Repository," which may be seen at the Lenox Library, New

York, the writer on "Robert Fulton" states:

> Although highly respectable, the elder Fulton was far from opulent, and the small fortune he left at his death was to be divided between his widow and five children. The patrimony of Robert was, therefore, but slender. To this circumstance, however, he never looked back with the false shame of common minds, but rather rejoiced on being considered, as he really was, the founder of his fortune.

ANECDOTES OF EARLY LIFE

THERE are several anecdotes which relate to Robert Fulton's early interest in mechanics—the first steps of progress toward his later skill. In 1773, when he was eight years old, his mother, having previously taught him to read and write, sent him to a school kept by Mr. Caleb Johnson, a Quaker gentleman of pronounced Tory

principles—so pronounced, in fact, that he narrowly escaped with his life during the Revolution. But Robert Fulton did not care for books, and he began at a very early age to search for problems never mastered and bound in print. This greatly distressed the Quaker teacher, who spared not the rod; and it is said that in administering such discipline on the hand of Robert Fulton, one day he testily exclaimed: "There, that will make you do something!" To which Robert, with folded arms, replied: "Sir, I came to have something beaten into my brains, and not into my knuckles." Without doubt he was a trial to his teacher.

He entered school one day very late, and when the master inquired the reason, Robert, with frank interest, replied that he had been at Nicholas Miller's shop pounding out lead for a pencil. "It

ROBERT FULTON, SR., AND MARY SMITH FULTON, THE PARENTS OF ROBERT FULTON

From the original paintings by Benjamin West (when a boy) owned by Alice Crary Sutcliffe. The originals are signed "B. West, 175-"

is the very best I ever had, sir," he affirmed, as he displayed his product. The master, after an examination of the pencil, pronounced it excellent. When Robert's mother, who had been distressed by his lack of application to his studies, expressed to the teacher her pleasure at signs of improvement, the latter confided to her that Robert had said to him: "My head is so full of original notions that there is no vacant chamber to store away the contents of dusty books."

These incidents to the contrary, it is nevertheless true that Robert Fulton did absorb a good knowledge of the rudiments of education.

In 1777, Congress held session in the old court house at Lancaster, and during this time the town became famous as a depot of supplies for the American forces. Rifles, blankets, and clothing were manu-

factured there, powder for the troops was stored in the town, and in that year a certain Paul Zantzinger furnished General Wayne's men with 650 suits of uniform.

ANDRÉ'S PAROLE

During the autumn of 1775, Major John André, while on his way to Quebec, was captured by General Montgomery, and with other officers, taken to Lancaster. He was granted local freedom on the following parole:

I, John André, being a prisoner in the United Colonies of America, do, upon the honor of a gentleman, promise that I will not go into or near any seaport town, nor farther than six miles from Lancaster, without leave of the Continental Congress or the Committee of Safety of Pennsylvania, and that I will carry on no political correspondence whatever on the sub-

ject of the dispute between Great Britain and the Colonies so long as I remain a prisoner.

Upon these conditions, Major André became an inmate in the house of Caleb Cope, and was tutor to John Cope, then thirteen years of age. Major André had a talent for art, and made a dainty sketch of a scene in England, probably near his early home. The drawing was in tints of green; a church spire in the background, and in the front, the heavy foliage of trees embowered a lodge. He gave this picture to Mr. Cope, who treasured it and wrote of it in these words: "In memory of the artist and of my affection for that gifted and deceived, that noble-hearted and generous man." Mr. Cope had five sons, of whom John was the eldest. André gave lessons in art to his young pupil, and also to Benjamin T. Barton, who became a

clever draftsman. The prisoner also played marbles and other boyish sports with his young friends. Robert Fulton was then eleven years old and eager for every form of activity. It is quite possible that when the Cope boys received their lessons in art, Robert may also have been included in the class and thus profited from the excellent tutor.

At a very early age, a love of art became to Robert a profound delight. One of his classmates in the Lancaster schoolhouse told, in after years, an interesting story of those days. He had an older brother, he said, who was fond of painting, and had learned the art of mixing and preparing colors, which he displayed upon mussel shells. The War of the Revolution at that time made it difficult to obtain painting materials from abroad, and few people had money or thought for

such quiet pastimes. This painting outfit fell into the possession of the younger brother, who carried it to school and showed it to Robert Fulton. Immediately the latter pleaded for a share, and his productions were so superior to those of the donor that the entire outfit was ultimately given to him.

"QUICKSILVER BOB"

FULTON was nicknamed by his comrades "Quicksilver Bob," because of his frequent purchases of the illusive and glittering metal, used by him in experiments which he declined to describe. Before this time he had drawn designs for firearms and had become expert in experimenting with them in order to determine the comparative carrying distance of different bores and balls. He is known to have manu-

factured an air-gun in the year 1779, but there is no record of its success. The firm of Isch and Messersmith were employed by the Continental authorities to make and repair arms for the troops. Guards were stationed at the doors of their shops, and to fill the orders the workmen labored night and day and also on Sundays, a rare trespass upon sacred time in those days. "Quicksilver Bob" came and went daily among the workmen, and it has been said that his mechanical judgment was so highly prized that his suggestions and drawings were frequently followed. It is asserted that he also painted signs for the village taverns and shops, as did his famous predecessor, Benjamin West.

In 1779, when Robert was fourteen years of age, he formed a friendship with Christopher Gumpf, an apprentice in the machine-shop of Mr. Messersmith. Chris-

topher was eighteen years old. His father, Deter Gumpf, an experienced fisherman in the quiet waters of the Conestoga Creek, used to take Christopher and Robert with him, and the boys would pole the flat-bottomed boat from place to place, over the good fishing-grounds. The exercise was severe, for the boat was cumbersome. Robert and Christopher agreed that they were tired of the work. About this time Robert went to Little Britain township for a brief visit with his aunt; and, during his absence from the machine-shops, he busied himself with the manufacture of a small working model of a fishing-boat to be propelled by paddles. He left this model in his aunt's attic with the request that it be kept, and in subsequent years it was an object of curiosity in the old lady's parlor.[1] When Robert

[1] Repeated inquiries have failed to locate this interesting relic.

returned to Lancaster, he made a set of paddle-wheels for Mr. Gumpf's boat, to be operated by a double crank motion. He tried this invention on the Conestoga River, opposite Rockford, and found it so satisfactory that it was used in subsequent fishing-trips.

At one time in 1777, as many as 2000 British prisoners were quartered at Lancaster, and the natives greatly feared an outbreak. The privates were kept at barracks, and the British officers lodged at public or private houses. The prisoners fared poorly enough at times. One day rations were cut off from the women and children, and they were forced to appeal for relief from starvation. The Hessians, some of whom had their wives with them, occupied square huts of mud and sod. Their strange encampment was naturally attractive to the boys of the village, and

Robert Fulton's ready pencil caricatured them.

FULTON'S CAREER AS ARTIST

At the age of seventeen, Fulton left Lancaster to seek his fortune, and took up his residence in Philadelphia as a painter of portraits and miniatures. His papers are singularly devoid of reference to these years. He was never retrospective, but eager for new accomplishment. Life offered him delights in art and science, and his industry appears to have made alternate choice in these fields of thought and enterprise. His energy was indefatigable; he not only earned his own living, but sent remittances to his mother in Lancaster. He apparently seized upon any form of employment which could be secured by personal endeavor. He is known to have drawn plans for machinery, which he sub-

mitted to various shops; he designed carriages and buildings, and at the same time worked at his regular profession as a painter. White's Directory of the City of Philadelphia for 1785 has this entry:

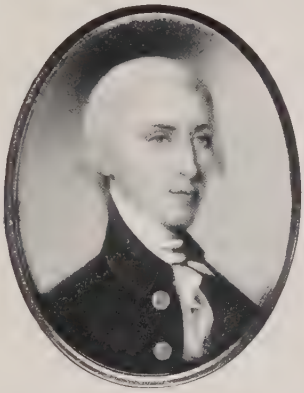
"Fulton, Robert: Miniature Painter. Corner of 2nd & Walnut Streets."

A diligent search has brought to light several examples of Fulton's art, which, by kind permission of the several owners, are here reproduced for the first time.

His success during the subsequent four years in Philadelphia was due to indomitable perseverance, aided by the charm of an attractive personality. He seems to have possessed a positive faculty for friendships, and his choice, determined by social rather than sordid considerations, speedily won patronage. He enjoyed a personal friendship with Benjamin Franklin, who favored him with unusual attention and kindness.

Owned by the Academy of Fine Arts, Philadelphia

MINIATURE OF CLEMENTINA ROSS



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MINIATURE OF SAMUEL BEACH

Owned by the Pennsylvania Historical Society

MR. AND MRS. JOHN WILKES KITTERA

MINIATURES PAINTED BY ROBERT FULTON

After a severe attack of pulmonary trouble, which gave evidences of a tendency toward a hasty decline, Fulton decided, upon expert advice, to seek the recovery of his health at the famous springs of Virginia. At this then fashionable place of resort, he formed friendships with several persons of wise judgment, and through their recommendation, and his own personal desire to seek out and profit by a study of the art treasures of Europe, he began to arrange his affairs for a voyage to the Old World.

In ill health, and desiring to provide a permanent home for his mother and sisters, he invested his savings of more than four hundred dollars in a farm in the township of Hopewell, Washington County, Pennsylvania. The adjacent town of Washington was at this time enjoying a land boom, and in addition to the purchase of the farm for his mother,

Fulton also bought four lots in Washington as laid out by Mr. Hogl, the pioneer settler. During the year 1793 Fulton wrote from London to Mr. Hogl to convey deeds for three of these lots to his sisters, Mrs. Mary Morris,[1] Mrs. Isabella Cook, and Mrs. Peggy Scott. From this fact it is known that all the sisters had married.

In 1786, Robert Fulton sailed for England, bearing numerous letters of introduction to distinguished Americans abroad. Among these, a letter from his friend and patron Benjamin Franklin

[1] David Morris, husband of Mary Fulton, was a nephew of Benjamin West. To him Fulton wrote in 1793 :

"Your Uncle West is now at the head of his profession and Presides at the Royal Academy over all the Painters of England. But he is a Great Genius and merits all the honour he has obtained—he has steadily pursued his Course, and Step by Step at length Reached the Summit where he now looks round on the beauties of past Industry,—an ornament to Society and Stimulis to young Men."

Extract from a letter owned by the Chicago Historical Society.

to Benjamin West, the Pennsylvania artist who had attained high honor in London, was of special help in launching Fulton in the art circles of Europe. The connection between the West and Fulton families, and the pronounced similarity of taste and ambition, attracted them to an immediate and intimate comradeship.

EARLY EXPERIMENTS OF WILLIAM HENRY AND JOHN FITCH

Fulton must already have been familiar with some of the early attempts toward steam navigation. His Lancaster townsman, William Henry, an ingenious gunsmith, during a visit in 1760 to England, had applied his mind toward the possibility of using a Watt's engine in the propulsion of boats. In Bowen's "Sketches of Pennsylvania," it is asserted that

Henry, after his return to Lancaster, constructed a machine, and in 1763 attached it to a boat. He made an experiment with this unique craft upon the Conestoga River, but by a mishap the boat became disabled and sank. He afterward constructed a second model with improvements, and in 1782 he presented to the American Philosophical Society a design for a machine with steam as motive power. An intelligent German, Herr Shoepff, who visited the United States in 1783, while in Lancaster made the acquaintance of Henry, and was shown a machine intended for the propulsion of boats. He reported that Henry himself had been doubtful whether such a machine would find favor with the public, "as every one considers it impracticable to make a boat move against wind and tide." But Henry was credited with the

assertion that "such a boat *will* come into use and navigate on the waters of the Ohio and Mississippi rivers," although the time for appreciation and application had not yet arrived.

John Fitch, whose name is also rightfully honored as a pioneer experimenter in steam navigation, was a frequent visitor at the house of Mr. Henry in Lancaster. There were doubtless discussions between the two men in regard to the project which Henry had under consideration. On the 2d of December, 1785, at a special meeting of the American Philosophical Society, John Fitch was personally presented to the members, and consulted a few, including Henry, as to his project.

Of Henry and Fitch, and of Robert Fulton's ultimate success in solving the problem of steam navigation, the late Dr. Robert H. Thurston, former Director of

the Department of Mechanical Engineering of Cornell University, wrote:

> Fitch evidently made the first successful experiment in the propelling of boats by steam; but William Henry has probably the honor of originating the idea, and building the first steam-boat ever built in the United States. Fitch improved on Mr. Henry's model, and Fulton improved on both. . . . Fulton took the products of the genius of other mechanics, and set them at work in combination, and then applied the already known steam-boat in his more satisfactorily proportioned form, to a variety of useful purposes, and with final success. It is this which constitutes Fulton's claim upon the gratitude and the remembrance of the nations. And it is quite enough.

At the time of his visit to England, Robert Fulton's preferred aim was art, though his active mind soon began to busy itself with various inventions. West was conspicuous for the consideration which he showed to young artists; but he bestowed unusual favor upon Fulton, who

became an inmate in his home. During these years Fulton worked indefatigably at his art, and while the sum of his works is unknown, records of a few of his paintings have been found. There is mention in the Royal Academy catalogue of three portraits as having been on exhibition, as follows: In 1791 "Portrait of a Young Gentleman," and "Portrait of Two Young Gentlemen"; and in 1793 "Portrait of a Lady" (Mrs. Murray). The same year he also exhibited four paintings, two subject pictures and two anonymous portraits, at the Society of Artists.[1]

FULTON'S COUNTRY TOUR IN ENGLAND

James Renwick, in his "Biography of Robert Fulton," published in Jared Sparks's "Library of American Biogra-

[1] For list of Fulton's art works, see Appendix, page 354.

phy," is the only historian to refer to an interesting tour made about this time by Fulton among the castles and country-places of the British nobility for the study of their artistic treasures. After leaving London, he went to Exeter, in the County of Devon, and for a time was a resident of Powderham Castle, the chief seat of the Courtenays. The steward of the estate, a gentleman by birth and education, entertained all guests without court rank, for the Baron of Powderham lived in a degree of royal exclusion. During Fulton's residence at the castle, he occupied himself with the copying of several famous works of art. To his titled benefactor Fulton extended a gratitude which was later put to the test, and found faithful. Professor Renwick tells us, in somewhat veiled terms, that several years after Fulton had returned to America,

the heir of the title and fortunes of the Courtenays, became a refugee in our land under circumstances of disgrace and humiliation. . . . Every door was closed against him except that of Fulton. The feelings of Fulton were probably those which lead the benevolent to minister to the comforts and to soothe the mental anguish of the condemned criminal; but in the instance we allude to, it required not only the existence of such feelings, but a high degree of courage to exercise them, in the face of a popular impression, which, whether well or ill founded, was universally entertained.

During Robert Fulton's sojourn in Devonshire, he formed friendships with several men of distinction, and it is said that portraits and landscapes painted by him at this period are to be found in many of the stately homes of England. It should be remembered that during all these years he was supporting himself entirely by his own efforts with palette and brush.

In Devonshire he won the personal interest of two influential peers of the realm, whose scientific investigations were a keen joy and an important factor in defining his subsequent career. These men, the Duke of Bridgewater and Earl Stanhope, were scientists of advanced thought. The former had inherited a vast estate, which, although it abounded in mineral wealth, failed to render an adequate financial return, because the mines were inaccessible through lack of a proper development for the transportation of their output. The growing town of Manchester had need of coal for its manufactories, and there was plenty of coal in the lands of the Duke of Bridgewater. But all products had to be carried from the estate in sacks upon pack-horses. The duke, therefore, with the aid of a native genius, Brindley by name, whom he termed his engineer,

opened canal navigation throughout his lands. This was attained only at great cost in the face of appalling difficulties and much opposition. It is said that, at one time, he barely escaped confinement as a lunatic, so ridiculous did his plans appear to critical friends and relatives. At the time Fulton met him, the success of his canal project was manifest, and he was already amassing wealth through the aid of this new method of water carriage. Similar schemes were projected throughout the country, and the duke became the proprietor of several navigation companies which were at that time in formation to construct a great system of waterways through England. It is thought that the duke's plans, if not his solicitation, had much to do with Fulton's abandonment of art for civil engineering; for, from this time on, his thoughts were

occupied with canal navigation and allied subjects of practical utility.

With the Earl of Stanhope, whose talent ran to mechanical devices and scientific research, Fulton entered into a spirited correspondence. The earl was an enthusiast; his inventions, though they bordered on great discovery, and were based upon noble aims, were never carried to a degree of commercial perfection. One of his plans was for the application of steam to navigation, by the use of a curious paddle, resembling the webbed foot of a waterfowl. He communicated his ideas on this subject to Fulton, who showed the practical impossibility of the project. Cadwallader D. Colden and Professor Renwick both authoritatively stated that Fulton, in a letter written during the year 1793 from Devonshire, briefly gave, in exchange for the earl's impracti-

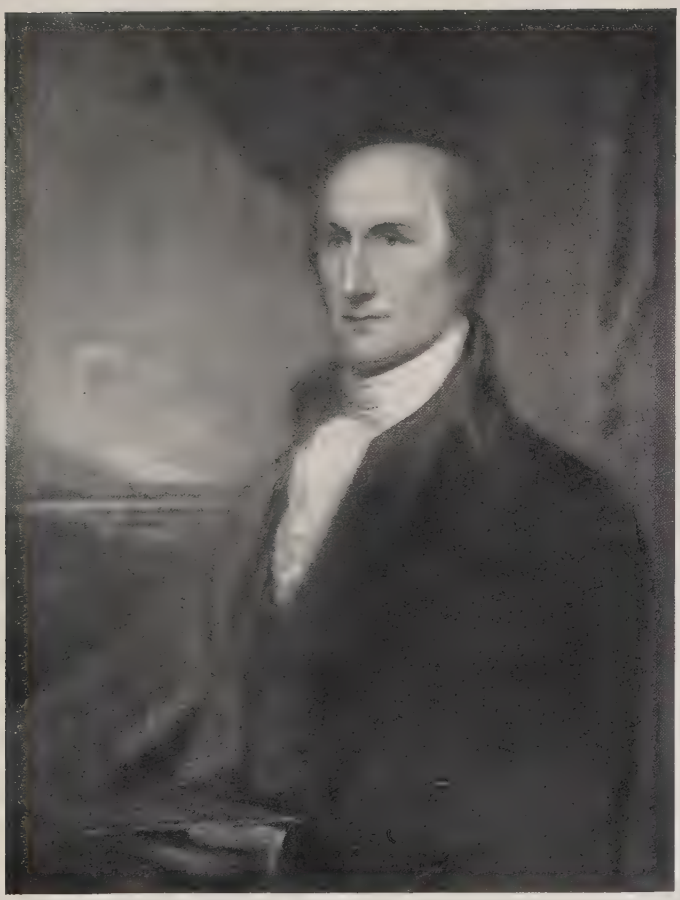
cable plan for steam navigation, the very principles of his own later application, which afterward was successfully demonstrated on the Hudson River.[1] Earl Stanhope, however, proceeded with his own design, and in an experiment made at the London docks, met with failure. But his generous nature continued to find interest in Fulton's plans and aspirations, and upon several subsequent occasions he gave evidences of his sincere friendship for the American inventor.

From Devonshire, Fulton went to Birmingham, where he took up his residence. Although his name does not appear in the list of engineers who were engaged upon the Duke of Bridgewater's project of building canals from Birmingham to the chief seaports, there is little doubt that he went there with the aim of studying

[1]See page 129.

the new enterprise. It is asserted by several biographers of Fulton that during his eighteen months' residence in Birmingham he met and entered into confidential correspondence with Watt, the inventor of the steam engine.[1] One narrator states that Fulton actually superintended the construction of an engine, where no other aid could be obtained. This friendship has been questioned by others, whose proof against it lies in the fact that a letter from Joel Barlow stated that Fulton had never met Watt. Mr. Colden agrees with Renwick that as early as 1793, Fulton had turned his thoughts toward steam navigation as an important possibility, and had outlined his plan for putting it in practice, and this fact is con-

[1] A letter recently shown to the Society of Naval Architects by Sir Frederick Bramwell proves that Fulton wrote to order an engine from Watt in 1794. There is no record that the order was filled. See Appendix, page 303.



CHARLES, THIRD EARL OF STANHOPE

Painted by Robert Fulton. Now in possession of Hermann Livingston

clusively proved by the first reproduction of Fulton's letter to the earl (see p. 129). But these dreams did not keep him from the development of other practical contrivances. In 1794 he secured from the British government a patent for a double inclined plane for raising and lowering canal-boats, and also received from the British Society of Arts and Commerce the thanks and an honorary medal of the society for a submitted invention for sawing marble. About the same period he obtained English patents upon a machine for spinning flax, and for a new invention for twisting hemp rope. He appears to have been reaching out in many directions of thought, to try to solve some industrial problem, great or small; but his energies were chiefly turned toward the further development of canal systems. He designed and obtained English patents for a

dredging-machine for scooping out earth to form the channels for canals or aqueducts, and later patented "The Market or Passage Boat" for use upon canals; and still later, a "Dispatch Boat," devised for special speed in transporting goods which required expedition. These smaller inventions, although they were useful at the time in furthering the utility of canal navigation, were but steps toward a greater development of the inventor's knowledge of practical science. The distinguished John Owen, founder of English Socialism, a one-time partner of Fulton in the enterprise of the dredging-machine, in his autobiography tells of the interesting fact of a meeting in 1794 between his friends, Samuel Taylor Coleridge, the poet, and Robert Fulton, whom he terms "the famous American engineer and inventor and introducer of the steam-

boat." It is a significant coincidence that the author of "The Ancient Mariner" should have known the inventor who was so soon to change the world's methods of navigation. Fulton answered in practical fashion the dreamy question of the poet,

> But why drives on that ship so fast,
> Without or wave or wind?

Fulton's power as an accurate draftsman enabled him to describe fully upon paper, with accompanying charts, his various models of inventions. He also made copious notes upon the subjects which he had in mind, and later, as his ideas matured, he wrote essays and pamphlets upon specific subjects, and sent them, with accompanying letters, to those persons who had the power to promote their advancement. In 1796 he published "A Treatise on Canal Naviga-

tion,"[1] illustrated by seventeen plates, and designed to show "the numerous advantages to be derived from small canals." The title-page indicated that the authorship was "By Robert Fulton, Civil Engineer," his first public use of that signature. He appears to have entirely abandoned his painting and thereafter to have used his talent for art solely to illustrate his ideas for mechanical contrivances.

Throughout the succeeding pages he endeavored to show the advantages of a system of small canals, which, if introduced in any fertile country, would increase the financial resources of all the inhabitants of the inland districts, by enabling them to offer their farm products to the inhabitants of the larger coast towns. He acknowledged that his first study of the subject of canal navigation

[1] See Appendix, page 304.

was inspired by the reading of a paper descriptive of a canal proposed by Earl Stanhope. Fulton's treatise dealt with the practical contrivances necessary for such a waterway, and described his patents already secured for the easy transportation of boats from one level to another by use of inclined planes.

Fulton did not confine himself to a mere recital of the technicalities of his invention; with broad-minded prophecy he viewed the possibilities of canal navigation as contributing to the best form of political economy for any nation which would adopt it. He calculated the profits to be derived, the expenses incident to the development of his plan, and the immense advantage which would result from an enlarged system which, like arteries of the body, would unite all parts of the country. He especially emphasized the advantages

which America would gain from the system.

Fulton sent copies of his treatise to Governor Mifflin of Pennsylvania, and to George Washington,[1] who was then President of the United States, urging their thoughtful consideration of the project. Washington wrote a courteous acknowledgment, but there is no record of official action on the part of the Federal government.

The "Treatise on Canals," with Fulton's letter to Governor Mifflin, was translated into French and published in Paris in the seventh year of the Republic. It won the attention of many engineers and mechanicians, but apparently produced no large constructive results.

Universal free trade was the avowed motive of Fulton's various experiments, and for this cause he wrote several

[1] See Appendix, page 306.

treatises during his residence in Birmingham and later. In 1795 he published some essays on canals in the London "Morning Star," and two years later addressed a paper to the French Directory which he entitled "Thoughts on Free Trade." It should be remembered that only a short time before Fulton's removal to Birmingham, the French Revolution had charged two nations with new desires for political advancement. This great historical event had immense weight in the definition of Fulton's subsequent career.

That Fulton was studying these international disputes is proved by an extract from a letter written to his brother-in-law, David Morris, in 1794. It is published by permission of the Chicago Historical Society:

"As to Europe it is all in alarm, the united efforts of England, Prusia, Spain, Holland, Germany, Rushia, and all the

allied Powers have not been able as Yet to mount Another King on the Back of the French Nation. It is almost incredible with what Vigor the French meet their enemies, while *Live the Republic* is the Constant Song; and Liberty or death their *Motto*. Thus determined to Establish Republickism they have at this moment, five hundred thousand Men under Arms, Ready for the ensuing Campaign.

The Allies Seeing so much unshaken firmness Ready to meet them begin to despair of King making, And think it time to Look to their own Safety, As the discontented enumerate fast in all the Belligerant States, the People Contemplate the Nature of a Republic, and the more they think, the more they admire it. When a Revolution once takes place in the mind it will Soon make its appearance externaly. And I Can assure you there

ROBERT FULTON

From the original painted by himself in 1795, now
owned by Mrs. Robert Fulton Blight

This portrait was purchased from the authorities of Fulton Hall, Lancaster, Penn., by Robert Fulton Blight. It was exhibited at the World's Fair in Chicago, and at the request of the German Consul was copied by Thomas Anschutz for the Postal Museum at Berlin

are numbers who do not hesitate to say that Monarchial Governments are going out of Fashion. Things Being thus situated it is the report of the day that the King of Prushia has withdrawn from the alliance. The Empres of Rushia has certainly found work at home with the turks. And thus the French are eased of two powerful adversaries—how things will terminate God only knows. But as far as Man Can penetrate into events it is believed the French will prove Successful and establish a Republic, the Natural Consequence will be Republicks throughout Europe (In time.) It has been much Agitated here Whether the Americans would Join the French. But I Believe every Cool friend to America Could wish them to Remain nuter. The americans have no troublesome Neighbours, they are without foreign Possessions, and do not

want the alliance of any Nation, for this Reason they have nothing to do with foreign Politics. And the Art of Peace Should be the Study of every young American which I most Sincerely hope they will mentain"

His earliest impressions of patriotism had been gained during the struggle for American Independence, and the reasonable and sympathetic minds of England and America were excited to profound commiseration over the unhappy conditions resultant from the misrule of the French democracy. The unbiased minds of the American people were active in observation; Fulton, who was avowedly a Republican, shared the prevalent sympathy for the oppressed. But in 1796 the excesses of the French Revolution had ceased, and Great Britain commenced an aggression on the seas through which the

United States were the greatest sufferers. Fulton shared the resentment which England's attitude excited among Americans and set himself the task of abolishing piracy upon the seas. Temporarily he turned his attention from canal structure to the study of a new weapon designed to provide universal peace; and this resulted in the invention of the torpedo, a work of equal magnitude to his later production, the steamboat.

PART II

ROBERT FULTON IN FRANCE

IN the year 1797, the Earl of Malmesbury went to Lille to propose terms of peace between England and France. During that neutral period, Fulton thought that he saw an opportunity to convey to the world, through the French Directory, his ideas for future tranquillity, which embraced "a Universal betterment of Humanity, through a constructive system of Canals, and a destructive system of Torpedoes." His great hope for universal peace led him to dream of an ultimate invention which should set at naught the oppression of maritime influences. He planned to make the seas and waters open channels to a friendly intercourse among the nations. To this end,

without abandoning his hope of canal structure for the welfare of inland districts, he conceived a submarine contrivance, which he named a "Torpedo," that through tremendous explosive force might destroy the armaments of the seas. The French statesman Carnot, an inflexible republican, formerly Minister of War, was then an executive of the Directory, but after the revolution of 18 Fructidor he was obliged to flee to Germany. Fulton had reason to hope that he would be able to influence Carnot, who was already, through correspondence, his personal friend.

For this purpose, and with the hope of perfecting patents in France for his inventions relative to canals, Robert Fulton journeyed from London to Paris. He called immediately on the poet and diplomat Joel Barlow, to whom he presented

credentials, and took up his abode in the same hotel where Mr. and Mrs. Barlow were living. Later, when the Barlows opened a home of their own, they invited Fulton to join them. A rare friendship between the two men ensued, and for seven years thereafter, Fulton resided with them.

During Fulton's sojourn in France, Barlow was not charged with American public duties; but in French politics he identified himself with the Girondist party, and was not without political influence; Robert Fulton shared his enthusiasm and interest.

FULTON'S PANORAMA

Fulton invented the first panorama ever shown in Paris, which was ready to be exhibited about the year 1800. A wealthy American had purchased a large tract of

ground in a central position, and had built upon it a row of shops, arranged along two sides of a covered cloister. Upon one section of this property, Fulton suggested the erection of two lofty, circular buildings, and these were constructed for the exhibition of the panorama. The venture attracted great attention and yielded a substantial profit. It was of sufficient importance to suggest the name of the street upon which it was reared, and to this day "Rue des Panorames" serves as a reminder of Fulton's production.

The subject of the panorama, recently discovered upon record in Paris, was "l'Incendie de Moscow." The scenes depicted were obviously those of one of the early devastations by fire, of which several are recorded in history, and obviously not that later famous tragedy of 1812. It is interesting to consider that many of the survivors of Napoleon's army of invasion

and retreat may have looked upon the canvases whereon Fulton had portrayed earlier scenes of horror and devastation.[1]

Robert Fulton possessed to a remarkable degree the power of concentrated

[1] M. Henry B. Bayer, Special Commissioner to the United States for the International Maritime Exposition of Bordeaux, in his address at the Jamestown Exposition, on Robert Fulton Day, said that Fulton's panorama was an exceptional success. The people were so attracted to the new recreation that a song extolling its merits became popular throughout France.

One verse, with translation, follows:

Paris pas plus grand que cela,
Jouit de succès légitimes.
Un savant vous le montrera,
Pour un franc cinquante centimes.
Et tout le monde donne ou donnera,
Dans le pano, pano, panorama!

Paris is not too great
To enjoy a lawful success.
A wise man will show it to you
For one franc and fifty centimes (30 cents).
And everybody is giving or will give
To the pano—pano—panorama!

Later Colonel Jean Charles Langlois, the painter of battle scenes, used Fulton's panorama for the reproduction of victories of the French Army.

thought. He studied French, Italian, and German, and acquired a proficiency in the three languages; higher mathematics, physics, chemistry, and perspective also demanded his attention as he progressed in scientific research. It is known that he painted several portraits while in Paris, and one of these, of Joel Barlow, is here reproduced. He mingled with the prominent artists of the day.[1]

But just at that period canal extension was the main topic of his thought. To this end he addressed letters explanatory of his project to men of distinction in America,[2] France, and England. Of these, the let-

[1] Houdon, the great French sculptor executed an admirable bust of Fulton which was shown in the Salon in the year IX, and Robert Le Fevre, painter to the King and a member of the Legion of Honor, painted a likeness of Fulton. A beautiful French miniature of the same period is also extant, now the property of Mrs. Joseph Drexel, of Philadelphia.

[2] See Fulton's letter to Washington, Appendix, page 306.

ter to Washington offers indisputable proof that Fulton was the first to suggest the Erie Canal. The claim to this priority has been disputed, but the testimony here recorded seems conclusive.

In the Lenox Library may be found the French original of the letter which apparently was addressed to Bonaparte shortly before his departure for Egypt.[1]

FULTON'S TORPEDO

As early as December, 1797, Fulton, aided by Barlow, experimented upon a machine designed to impart motion under water to "carcasses" of gunpowder. An elongated and oval construction was to be forced to a point below water, and, at a calculated time, discharge its fire. The project contained the initial idea of Ful-

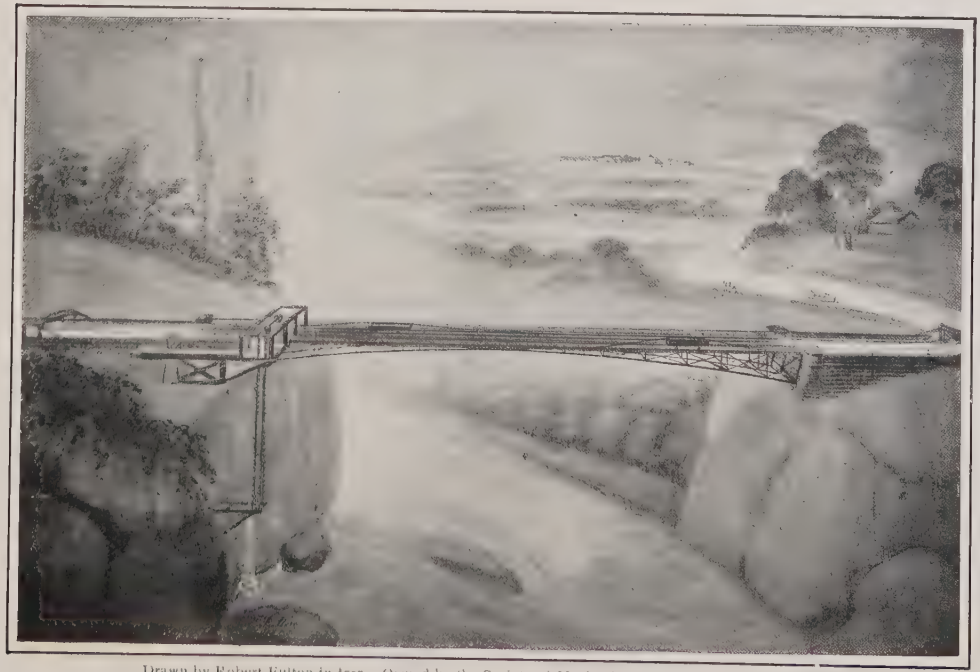
[1] See Appendix, page 313.

ton's subsequent invention of the torpedo-boat, but at that time the test failed to be satisfactory. The name "torpedo," chosen by Fulton for his submarine contrivance, has since been given to all similar machines.[1] Sir Thomas Herbert, the English traveler and author, had written:

> The Torpaedo or Cramp Fish came also to our hands, but we were amazed (not knowing that fish but by its quality) when a sudden trembling seazed on us; a device it has to beget liberty, by evaporating a cold breath to stupefie such as either touch or hold a thing that touches it.

After the first failure, with characteristic hopefulness Fulton began immediately to formulate a variety of new experiments. There is no doubt that at

[1] Fulton's countryman, David Bushnell, a graduate of Yale, during the Revolution had invented a submarine "magazine" which by means of clockwork would explode a case of gunpowder under water; but the attempts to use the device resulted in disappointment.



Drawn by Robert Fulton in 1797. Owned by the Society of Mechanical Engineers, New York City

PLAN IN WATER-COLOR FOR A HIGH-LEVEL CANAL

this time he valued the torpedo project with more favor than his already conceived idea of steam navigation.

On August 28, 1798, Mr. Joshua Gilpin[1] of London said in a letter to Lord Stanhope: "I hear from France that Mr. Fulton has not yet gone to America; and probably it may be some time before he gets away, as an embargo rests on our vessels; besides which the Government and he are amusing each other (I think however to little purpose) on his new invention of the submarine boat. I fear this will keep him from more useful pursuits." Many of Fulton's friends were doubtful of the value of his ventures. That the rumor of their disapproval reached him is shown by

[1] Joshua Gilpin, born in Philadelphia 1765, lived in England 1795-1801. He published "Memoir of a Canal from the Chesapeake to the Delaware," and died 1840. Fulton wrote to Gilpin in 1798 that his (Fulton's) plans had been adopted for the Canal from Paris to Dieppe and Cambrai, the only known record of his engagement in this project.

a passage in a letter[1] dated "Paris, November the 20th, 1798," to Mr. Gilpin, containing a reference to Mr. Cartwright. Edmund Cartwright, an English clergyman and graduate of Oxford, had in 1785 obtained the first patent for a power-loom for the weaving of cotton cloth. Two years later he invented a wool-carding machine; and, in 1797, a steam-engine in which alcohol was used. It is asserted that he "assisted Robert Fulton in his experiments with steamboats." Joel Barlow also mentions him, in a letter to Fulton in 1802, when, after an interview with Mr. Livingston, he says that he has heard unfavorable reports about Cartwright's engine, and doubts whether it will do for the proposed steamboat. "If you recur to Watts," he adds, "it is probably best to lay it horizontal, his fears with regard to the

[1] See Appendix, page 316.

strain on the boat from the up-and-down stroke are not without foundation."

The letter to Joshua Gilpin, in the Appendix and never before published, gives additional proof of Robert Fulton's constancy to his country. Those who have criticized his aim of securing "a lasting peace" by means of a destructive agent, the torpedo-boat, a weapon designed to cause wholesale ruin and devastation, should remember that he was animated by the hope that so powerful an instrument in the hands of a righteous nation would ultimately put an end to all warfare.

Throughout the summer of 1800, Fulton was at Havre, busily engaged upon experimental work with his torpedoes. Mrs. Joel Barlow, on medical advice, had gone there for the invigoration of the sea air and baths. Mr. Barlow's affairs detained him in Paris, and his letters to his

wife, to whom he was devotedly attached, contain interesting references to Fulton's submarine projects. Fulton made divers tests with his torpedo-boats against the British frigates which hovered along the coast. The situation was filled with suspense, and the utilization of a new weapon of warfare seemed soon to be realized. But experiments were costly, and Fulton was frequently in need of money for the furtherance of his schemes. From time to time Barlow forwarded drafts, which apparently were the profits from Fulton's panorama, then on exhibition in Paris. These profits were shared by a Mr. Thayer,[1] who had secured an extension to fifteen years of the original ten years' patent, on April 26, 1799, granted to Fulton. Barlow wrote to his wife, on 29th Thermidor, 1800:

[1] James William Thayer, an American.

Tell Toot he shall have the $1000 in a day or two, but Thayer has not paid according to his promise. The pictures go not well,—50 or 60 livres a day for both,—and at this season! But the excessive heat prevents everybody from stirring out, especially upon the Boulevard, and in the day time.

"Toot" was Barlow's pet name for Fulton, possibly suggested by the tooting of the steam-engine with which he was already experimenting.

A few days later Barlow forwarded $500 through a banking house, and promised more in a day or two.

During that summer Fulton spent his efforts in the development and practical demonstration of submarine navigation. His friends, of whom Barlow was chief, were anxious lest he should overtax his strength.

The torpedo experiments were attended

with danger and under hostile observation. Barlow wrote to his wife 17th Fructidor:

> And poor Toot, I suppose, is now gone. I have not believed of late there was much danger in the expedition especially if they don't go over to the enemy's coast. I have certainly seen the day when I would have undertaken it without fear or apprehension of extraordinary risk. I can't say that I am now without uneasiness. I should probably have less if I was in the boat and without bodily pain. But there is really very little to fear. The weather is fine; they are only going along the coast. He is master of all his movements, and it appears to me one of the safest of all hostile enterprises.

Throughout his manœuvers, Fulton recognized the necessity of governmental coöperation. He believed that the project in hand was for the benefit of the nations of the earth, and not for the furtherance

of individual or even of national aggrandizement. His device for submarine gunnery must, if it should prove practicable, be guarded by wise laws for the safety of navies; but first it must be practised and proved of value in warfare by some one nation. To that end he hoped to find the Government of France willing to give the system a fair trial.

His first appeal to the Directory was encouraged. With the appeal he forwarded a descriptive letter which defined the advantages of his invention. He described it as a weapon capable of freeing the Republic from all oppressors. The Directory gave him reason to hope that his plan would be received with favor, and day by day he awaited their reply. Barlow added his influence to obtain official sanction for an expedition against the enemy's boats; but there were many rebuffs and

few encouragements, although Fulton's patience was marked and emphasized at every period of his busy life.

A commission had been appointed by the Minister of the Marine during the preceding year (1799), and the reply sent by Fulton, and written in French, is the only Fulton document preserved in the British Museum.[1] It conclusively proves that Fulton had received very definite encouragement from the Government of France, and it emphasizes the inventor's desire, which dominated his enthusiasm throughout all his experiments, that an eternal peace would result from this warlike contrivance.

Epistolatory skirmishes between the parties to this transaction were almost as numerous as between the two warring

[1] A translation of this very interesting document will be found in the Appendix, page 318.

nations. All of the correspondence is not now to be had, but the part that has been preserved reveals, for the first time, the actual details of the agreement relative to the *Nautilus,* the first submarine torpedo-boat. The vessel was built during the latter part of 1800, and throughout the succeeding summer Fulton was at Brest, where the superb harbor, the finest on the coast of France, gave him the right opportunity for experiments.

ATTITUDE OF NAPOLEON

On the 8th Ventôse (February 28, 1801) Fulton received authoritative word from Napoleon, through the Secretary of the Port, to send his torpedo-boat against the English fleet. After considering the matter four days, Fulton accepted the proposition and agreed to the terms of

the contract. The following letter, found among Fulton's family papers, is here published for the first time:

1st Division
Bureau of the Port.

Paris, 7th Germinal,
the 9th year of the One
and Indivisible Republic.

The Minister of the Marines and Colonies.

To Monsieur Robert Fulton,
Rue de Vaugirard No. 50, Paris.

I announced to you, Sir, on the 8th of Ventôse, that the First Consul had authorized me to accept your proposition relative to the *Nautilus*. You will have seen by that letter that you will, as a consequence, be credited with the sum of 10,000 francs to repair this Machine, construct the auxiliaries, and to convey, at your own expense, the *Nautilus* to Brest.

It has been decreed that you will be allowed for the destruction of the Enemy's boats, according to their strength, as follows:

400,000 francs for those of more than 30 cannon.

200,000 francs for those of more than 20 cannon up to 30 cannon.

150,000 francs for those of from 12 to 20 cannon.

60,000 francs for those of 10 cannon.

This force is the minimum, below which you will have no power to return claim.

By your letter of the 12th Ventôse, you declare your acceptance of these conditions, and I give the order to put to your account the sum of 10,000 francs, by means of which you must put in order the armor, the equipment and the expedition of the *Nautilus*.

There exist several means of determining in an authentic manner the destruction of the enemy's boats. The attestations, the declarations, and the interrogations put in legal form by competent authorities, will serve you as title to reclaim the payment of the sums which may ultimately be due you.

The navigation which you are about to undertake being absolutely different from others, also the style of war which the *Nautilus* is destined to make upon the enemy, it is not

possible to indicate in advance a fixed method of affirming the truth of the facts. But it will be supplied by the information of the Commissary of the Government of England, and to the Maritime Prefects, every time it becomes necessary.

(Signed) FORFAIT.

The inventor's continued appeal to Napoleon led to the appointment of a commission to examine the plans for submarine navigation, and to provide funds for the furtherance of the work of necessary construction. Napoleon desired, at the conclusion of the experiments, personally to view the plunging boat; but arrangements at the time being incomplete, a view of the apparatus was not granted. Fulton explains the reason for his refusal to grant an exhibition of his drawings to a committee of engineers, in a letter printed below. The Citizens Monge, La Place, and Volney were prominent members of

the National Institute, for Napoleon had taken care to select the three men whose judgment could best be relied on. Gaspard Monge, mathematician, had served as Minister of the Marine during two years, and later founded the Polytechnic School of Paris. Pierre-Simon de La Place, astronomer, had held the position of professor of mathematics in the École Militaire, and was later vice-president of the senate. And Count Volney, a famous French scholar and author, whose travels had brought him to America, was a member of the constituent assembly. It was these three men who held the power of judgment over the newly devised weapon.

Among Fulton's papers were found two letters addressed to this commission. Both are of unique interest, the first because it shows Fulton's personal reasons for guarding his invention with all care,

the second because of its detailed recital of his various experiments, with dates and subsequent consequences.[1]

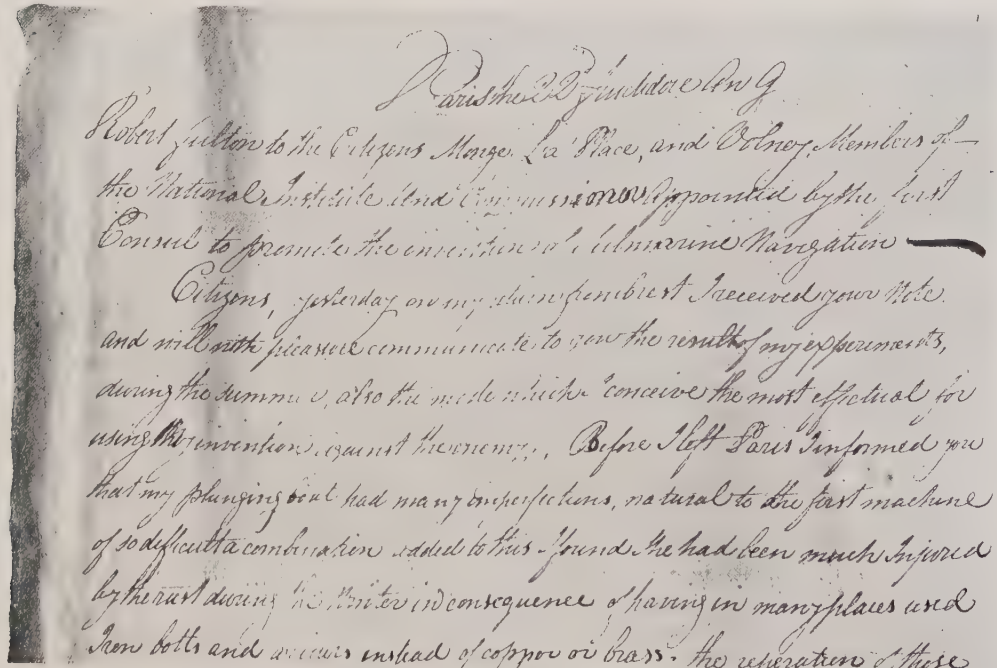
PARIS, the 3d Complimentary Day,
An 9.

Robert Fulton to the Citizens Monge, La Place, and Volney, Members of the National Institute and Commissionaries appointed by the First Consul to promote the Invention of Submarine Navigation.

CITIZENS: This morning I received yours of the 2nd Compl. As to the expense of a plunging Boat, I believe when constructed in the best manner with every improvement which experience has pointed out, She cannot cost more than 80,000 Livers. The Bombs Submarine may be estimated at 80 Livers each, on an average independent of the powder.

I am sorry that I had not earlier information of the [first] Counsul's desire to see the Plunging Boat. When I finished my experi-

[1] These letters are here given to the public for the first time.



Paris the 27 Fructidor 6th Q

Robert Fulton to the Citizens Monge, La Place, and Volney, Members of the National Institute and Commissioners appointed by the Executive Council to promote the invention of submarine Navigation

Citizens, yesterday evening I received your Note, and will with pleasure communicate to you the results of my experiments during the summer, also the mode which I conceive the most effectual for using the invention against the enemy. Before I left Paris I informed you that my plunging boat had many imperfections, natural to the first machine of so difficult a combination added to this - I found she had been much injured by the rust during the winter in consequence of having in many places used Iron bolts and screws instead of copper or brass. the reperation of those

FACSIMILE OF A PART OF THE FIRST PAGE OF FULTON'S LETTER TO THE CITIZENS MONGE, LA PLACE, AND VOLNEY
The original manuscript is owned by the estate of Cornelia Livingston Crary, daughter of Robert Fulton

ments, She leaked very much and being but an imperfect engine, I did not think her further useful,—hence I took Her to pieces, Sold Her Iron work lead and cylinders and was necessitated to break the greater part of her movements in taking them to pieces. So that nothing now remains which can give an Idea of her combination; but even had She been complete I do not think She could have been brought round to Paris. You will be so good as to excuse me to the Premier Consul, when I refuse to exhibit my drawings to a Committee of Engineers. For this I have two reasons; the first is not to put it in the power of anyone to explain the principles or movements lest they should pass from one to another till the enemy obtained information: the Second is that I consider this Invention as my private property, the perfectionment of which will give to France incalculable advantages over her most powerful and active enemy; and which Invention, I conceive, ought to secure to me an ample Independence. That consequently the Government should stipulate certain terms with me Before I proceed to further explanation. The First Consul is too just, and you know

me too well, to construe this into an avaricious disposition in me. I have now laboured 3 years and at considerable expense to prove my experiments. And I find that a man who wishes to Cultivate the useful Arts, cannot make rapid Progress without sufficient funds to put his succession of Ideas to immediate proof; and which sufficiency I conceive this invention should secure to me. You have intimated that the movements and combination of so interesting an engine should be confided to trusty persons, lest any accident should happen to me. This precaution I took previous to my departure from Paris for my last experiments, by placing correct Drawings of the Machine and every Movement with their descriptions, in the hands of a friend; so that any engineer capable of constructing a Steam engine, could make the plunging Boat and Carcasses or Bombs.

You will therefore be so good as to beg of the First Consul to permit you to treat with me on the business. And on this point I hope there will not be much difficulty. Health and sincere respect,

Robert Fulton.

PARIS, the 22d Fructidore, An 9.

Robert Fulton to the Citizens Monge, La Place, and Volney, Members of the National Institute, and Commissioners appointed by the first Consul to promote the invention of Submarine Navigation.

CITIZENS: Yesterday on my return from brest I received your note and will with pleasure communicate to you the result of my experiments, during the summer, also the mode which I conceive the most effectual for using my invention against the enemy. Before I left Paris I informed you that my plunging boat had many imperfections, natural to the first machine of so difficult a combination added to this I found she had been much Injured by the rust during the winter in consequence of having in many places used Iron bolts and arbours instead of copper or brass. The reparation of these defects and the difficulty of finding workmen consumed near two months, and although the machine remained still extremely imperfect, yet She has answered to prove every necessary experiment in the most satisfactory manner.

On the 3rd of thermidor I commenced my

experiments by plunging to the depth of 5 then 10 then 15 and so on, to 25 feet, but not to a greater depth than 25 feet as I did not conceive the Machine sufficiently strong to bear the pressure of a greater column of water. At this depth I remained one hour with my three companions and two candles burning without experiencing the least inconvenience.

Previous to my leaving Paris I gave to the C[itize]n Queyton, Member of the Institute, a calculation on the number of cube feet in my boat which is about 212. In such a volume of air he calculated there would be sufficient Oxygen to nourish 4 men and two small candles 3 hours. Seeing that it would be of great improvement to dispense with the candles, I constructed a small window in the upper part of the boat near the bow, which window is only one inch and a half diameter, and of glass nine lines thick. With this prepared, I descended on the 5th of Thermidor, to the depth of between 24 and 25 feet at which depth I had sufficient light to count the minutes on the watch. Hence I conclude that 3 or 4 such windows arranged in different parts of the boat, would give sufficient light for any operation during

the day. Each window may be guarded by a valve in such a manner that should the glass break, the valve would immediately shut and stop out the water. Finding that I had air and light sufficient, and that I could plunge and Rise perpendicular with facility, on the 7th Ther. I commenced the experiments on her movements. At ten in the morning I raised her anchor and hoisted her sails, which are a main sail and Gib, the breeze being light I could not at the utmost make more than about two-thirds of a league per hour. I tacked and re-tacked, tryed her before and by the wind, and in all these operations found her to Answer the helm and act like a common dull sailing boat. After exercising thus about an hour, I lowered the mast and Sails and commenced the operation of Plunging. This required about two Minutes. I then placed two men at the engine which gives the Rectilinear motion, and one at the helm, while I governed the machine which keeps her balanced two waters. With the bathometer before me and with one hand, I found I could keep her at any depth I thought proper. The men then commenced their movement and continued about 7 minutes when,

mounting to the surface, I found we had gained 400 metres. I again plunged, turned her round under water and returned to near the same Place. I again plunged and tried her movements to the right and left, in all of which the helm answered and the compass acted the same as if on the surface of the water. Having continued these experiments the 8, 9, 10 and 12th, until I became familiar with the movements and confident in their operation, I turned my thoughts to increasing or preserving the Air. For this purpose the Cn. Queyton advised to precipitate the carbonic acid with lime, or to take with me bottles of Oxygen which might be uncorked as need required: but as any considerable quantity of bottles would take up too much room, and as Oxygen could not be created at sea without a chemical operation which would be very inconvenient, I adopted a mode which occurred to me 18 months ago, which is a simple globe or bomb of copper capable of containing one cube foot to [*the paper is here torn*] a pneumatic pump by means of which pump 200 atmospheres or 200 cube feet of common air may be forced into the Bomb, consequently the Bomb or reservoir

will contain as much oxygen or vital air as 200 cube feet of common respirable Air. Hence if according to the Cn. Queyton's calculation 212 feet which is the volume of the boat, will nourish 4 men and two small candles 3 hours, this additional reservoir will give sufficient for 6 hours. This reservoir is constructed with a measure and two cocks So as to let measures of Air into the Boat as need may require. Previous to my leaving Paris I gave orders for this machine but it did not arrive till the 18th of Thermidor. On the 19th I ordered 2 men to fill it, which was an operation of about one hour. I then put It into the boat, and with my three companions, but without candles, plunged to the depth of about five feet. At the expiration of one hour and 40 minutes I began to let off measures of air from the reservoir and so on from time to time for 4 hours 20 minutes, without experiencing any inconvenience. Having thus succeeded

To sail like a common boat.

To obtain air and light.

To plunge and Rise perpendicular.

To turn to the right and left at pleasure.

To steer by the compass under water.

To renew the Common Volume of air with facility.

And to augment the respirable air by a reservoir which may be obtained at all times.

I conceived every experiment of importance to be proved in the most satisfactory manner. Hence I quit the experiments on the Boat to try those of the Bomb Submarine. It is this Bomb which is the Engine of destruction, the plunging boat is only for the purpose of conveying the Bomb to where it may be used to advantage. They are constructed of Copper and of different sizes to contain from 10 to 200 pounds of powder. Each bomb is arranged with a Gun lock in such a manner that if it strikes a vessel or the Vessel runs against it, the explosion will take place and the bottom of the vessel be blown in or so shattered as to ensure her destruction. To prove this experiment, the Prefect Maritime and Admiral Villaret ordered a small Sloop of about 40 feet long to be anchored in the Road, on the 23rd of Thermidor. With a bomb containing about 20 pounds of powder I advanced to within about 200 Metres, then taking my direction so as to pass near the Sloop, I struck her with the bomb in my pass-

age. The explosion took place and the sloop was torn into atoms, in fact, nothing was left but the buye [buoy] and cable. And the concussion was so great that a column of Water, Smoke and fibres of the Sloop were cast from 80 to 100 feet in Air. This simple Experiment at once proved the effect of the Bomb Submarine to the satisfaction of all the Spectators. Of this Experiment you will see Admiral Villaret's description in a letter to the Minister of Marine.[1]

The demonstration of the destruction of the sloop during the month of August, 1801, was attested by numerous spectators, and public approval was not lacking. The invention seemed of noteworthy importance to the officials and marine commissioners. It was considered a success, and established without doubt in the minds of the multitude of spectators the facts which Fulton had essayed to prove. Never-

[1] See Fulton's detailed experiments in Appendix, page 320.

theless, as time went on, the officials of France withheld from Fulton a full knowledge of their satisfaction: perhaps they did not feel well disposed toward the adoption of such destructive weapons; possibly it was difficult to convince the sailors, who would have to man the new boats, that the project was one which justified the apparent danger. Mr. C. Harrison Suplee, Editor of "Cassier's Magazine," in a recent article suggests that it was upon a final requirement that Fulton included in his terms,—although it is not here noted in Forfait's reply,—that he and his men be officially recognized, and might receive protection which would be accorded to Frenchmen, should they chance, in the fulfilment of their warring enterprises, to fall into the hands of the enemy. Fulton spent an unsuccessful summer in reconnoitering the coast, and

apparently received no pecuniary reward for his dangerous labor, as he failed to overtake an English ship.

Fulton continued his experiments with boats, upon and beneath the water, during the remainder of his stay in France. He openly demonstrated the principles of his inventions, and vainly offered them to the French Government. If Napoleon had been favorable to them, the history of Europe might have been changed. But Napoleon's scientific counselors had pronounced Fulton "a visionary" and his invention "a mad scheme" and "simple absurdity."

ALARM OF THE BRITISH MINISTRY

English statesmen were not unacquainted with the development of Fulton's plans, and Lord Stanhope delivered to the

House of Lords a message of warning. Barlow wrote to Fulton to acquaint him of the discussion, which terminated in September, 1803, in an invitation from the British Government to the inventor to display his torpedo contrivance. His notebook contains this entry:

> I agreed on certain conditions and Mr. Smith [1] set off for London to give in my terms. I then met him in Amsterdam in December with the reply, which not being satisfactory, he returned to London with other proposals and I went on to Paris.

Fulton wrote a careful explanation of his negotiations with the British Government—a folio of many pages which is now in possession of his heirs. He entitled it "Submarine Navigation & Attack" and outlined its purpose as follows:

[1] A name assumed by Dr. Gregory, of England, emissary from the Government.

"Reasons why I directed my attention to such inventions.

"Negotiations with the British Government on this subject.

"Description of the Engines & several modes of using them.

"Reasoning on the consequences of such Inventions."

Like all of Fulton's writings it is minute in detail, logical in construction and of convincing argument. He stated that his reason for the invention was "the possibility of destroying all military Marines and of giving liberty to the seas." He showed that Henry IV of France and the Abbé St. Pierre, with all their industry and influence, had endeavored in vain to form a congress which might decide on grievances. Therefore he sought for efficient means in the arts, where, after two years of study and experiment, he became

convinced of the utility of his torpedo project to accomplish the end of all warfare.

He outlined the plan to Lord Stanhope, who sounded the alarm in the House of Lords. In 1803 the Earl formed a committee to learn of Fulton's progress in the invention, which reported to Lord Sidmouth, then Premier of Parliament. The latter despatched a messenger[1] to Fulton, who was then in France, to invite him to return to England to communicate his torpedo plans to the British Government.

Fulton framed proposals, and upon their ultimate acceptance was induced to leave France. This he did on April 29, 1804, and reached London on the 19th of May. Lord Sidmouth had retired from office and Mr. Pitt was in power. When he viewed Fulton's sketch of an engine of

[1] Dr. Gregory, alias "Mr. Smith."

simple construction, easy application and powerful effect, the Prime Minister observed that if introduced into practice it would lead to the annihilation of all military marines.

It was agreed that His Majesty's Dock Yard and Arsenals were to furnish necessary means to give efficacy to Fulton's plans, and a contract signed by Mr. Pitt and Lord Melville was drawn between the inventor and the British Government.

By the terms of this bond, Fulton was to receive as an equivalent for his proposed mode of Submarine warfare a salary of two hundred pounds a month and one half the value of all vessels which might be destroyed by the new engine within fourteen years, the duration of the patent. It was further agreed that in case the Ministers decided not to prosecute the plans, yet it should appear that by means of them

the enemy's ships might be destroyed with greater ease than by any other mode of practice, the inventor should receive £40,000.

Under these conditions Fulton entered upon the work which detained him in England for two years of test, explanation, and entreaty. Lord Melville retired from office, and the death of Pitt and subsequent change of the Ministry gradually extinguished Fulton's hope of success. Finally in the autumn of 1806 the Government declined to adopt the invention, but fearing its power if turned against England, made overtures to Fulton to suppress the new mode of warfare. These offers Fulton summarily declined: and concluded his reply with these words:

"At all events, whatever may be your reward, I will never consent to let these inventions lie dormant should my Country

THREE VIEWS OF THE BUST OF ROBERT FULTON BY HOUDON

From photographs of the cast in the National Academy of Design. The bust is signed and dated "Houdon, An XII (1804) R. Fulton, 38 An." At the suggestion of the Colonial Dames of America, and at their expense, it has been recast in bronze for the New York Historical Society. The whereabouts of the original marble is unknown.

at any time have need of them. Were you to grant me an annuity of £20,000 a year, I would sacrifice all to the safety & independence of my Country. But I hope that England and America will understand their mutual Interest too well to War with each other And I have no desire to Introduce my Engines into practice for the benefit of any other Nation."

In the following words, he reminded the British Ministry of his intent to return to America:

"As I am bound in honor to Mr. Livingston to put my steamboat in practice and such engine is of more immediate use to my Country than Submarine Navigation, I wish to devote some years to it and should the British Government allow me an annuity I should not only do justice to my friends but it would enable me to carry my steamboat and other plans into effect

for the good of my Country.—It has never been my intention to hide these Inventions from the world on any consideration, on the contrary it has been my intention to make them public as soon as consistent with strict justice to all with whom I am concerned. For myself I have ever considered the interest of America[n] free commerce, the interest of mankind, the magnitude of the object in view and the rational reputation connected with it superior to all calculations of a pecuniary kind."

The terms of settlement, which were agreed by arbitration, are defined in Fulton's letter to Joel Barlow quoted later. He joyously accepted the release whereby he could take up the "several projects of sublimity" in his own country, and returned to his native land, from which he had been absent for twenty years.

PART III

THE TRIAL BOAT ON THE SEINE

THE evolution of navigation was almost as gradual as the evolution of man. To deny the preliminary stages in either case would be equally futile. From the moment when primitive eyes witnessed the voyage of a sun-warped leaf upon a pool, the object-lessons of boating were discernible. Soon the hollow log became the prototype of the first canoe; later intelligence built larger craft, with skins of slain beasts upheld to catch the propelling winds; after centuries of progress, perfected sailing ships moved from continental shore to shore. A study of history will reveal in the art of navigation, as in every other science, the clearly formulated ideas of successive progress.

In the year 1807 it remained for Robert Fulton to arrive, after years of study and numberless tests, at the definite knowledge of proper proportions, and to build the steamboat which successfully navigated and proved its utility upon the picturesque waters of the Hudson River. This happy combination of undaunted perseverance and achievement upon a scene of unrivaled beauty, with a group of historic witnesses, and Fulton's subsequent developments in the art of steam navigation, combine to make the occasion worthy of national honor at the close of a century.

It should be observed that the civilized world awaited the invention. In several countries inceptive attempts to solve the problem were manifest, and these are permanently recorded in history. In America John Fitch, William Henry, James Rumsey, and Edward West had experi-

mented with varying degrees of success; in Scotland, as early as 1781, Symington and Bell had tried an experiment upon the waters of the Forth and Clyde Canal, and in the same year, in France, the Abbé Arnal propounded his theories. In 1795, as already stated, Earl Stanhope of England experimented with a web-foot paddle; in 1801, Hunter and Dickinson, his countrymen, attempted a trip upon the River Thames with a boat which proved a failure. Robert R. Livingston, who later was associated with Fulton as partner in the enterprise of the *Clermont,* had tried his hand at the venture, as had also Nicholas J. Roosevelt, who subsequently (1809) was employed by Livingston and Fulton to study the possibilities of navigation by steam upon the Mississippi and other important Western rivers. To this already long, though incomplete, list of

sometime claimants for the honorable title of inventor may be added the names of William Longstreet, Samuel Morey, and John Stevens. Truly with Robert Fulton the "psychological moment" of demonstration had arrived.

But earlier than any of these essays toward the new art should be noted an experimenter, John Allen, M.D., who in 1730 mentioned a method of propelling a vessel by steam. He was a scientific Englishman whose fondness for experiment led him to publish a paper entitled "Navigation in a Calm." The advance of the becalmed sailing ship could be effected, he averred, "by the propulsion of water through an aperture in the stern of the vessel by pumps actuated by the labor of many men"; and he further suggested that "a fire-engine [evidently Newcomen's atmospheric steam-engine, patented

ROBERT FULTON

From the pencil drawing by John Vanderlyn. Executed by Vanderlyn at Joel Barlow's house in Paris, 50 rue Vaugirard, where Fulton was living 1797–1804. Owned by Judge Peter T. Barlow.

1705] with its furniture should be put on board a 70-gun ship having on board a 'Pneumatick engine' above described, with two 7 foot cylinders and their pistons,—the force, being equivalent to the labor of ninety or one hundred men, would drive a ship of twelve or fourteen tons at the rate of three knots an hour."[1]

These experiments are all links in an interesting chain which successively led to the perfecting of the first steamboat built by Robert Fulton.

It is important to emphasize the fact that Fulton himself was fully cognizant of those earlier attempts; indeed, he would have deprecated the inference that he had not duly profited by the prior experiments of other scientists. His generous mind sought for comradeship in the solution of the important problem. In his hitherto

[1] Eliot Hodgkin (F. S. A) in "Rariora."

unpublished "Notes for an Argument on Steam Boats, Should Argument Become Necessary" (in the possession of the estate of his daughter, Cornelia Livingston Crary), he distinctly states:

It is now about thirty years since experiments commenced in Europe and America, with a view to move boats or vessels to advantage by the power of steam engines. All of which failed of any useful result. As a proof of this, there were nowhere, either in Europe or America, any kind of steamboat in actual operation when Messrs. Livingston and Fulton commenced their experiments upon the Seine near Paris in the year 1802. And the repeated failure of men of science, among whom were the ingenious Earl of Stanhope, gave an impression to the public mind both in Europe and America, that it was impracticable to make a useful steamboat, and under this belief those who attempted it were considered as visionaries or mad men. In this state of things Mr. Livingston, while in Paris in 1802, persuaded Mr. Fulton to make the attempt, and he, fortunately for our country, has

succeeded. America therefore claims the honor of this important invention which may justly be considered an epoch in the useful arts, to the incalculable advantage of these young and rising states.[1]

A legal form of agreement was drawn by the two men, and signed at Paris, October 10, 1802. It runs as follows:

THE FULTON-LIVINGSTON PARTNERSHIP[2]

Memorandum of an Agreement entered into this tenth day of October in the Year One Thousand Eight hundred and two, between Robert R. Livingston Esq., of the State of New York, and Robert Fulton of the State of Pennsylvania.

Whereas the said Livingston and Fulton have for several years past separately tried various mechanical Combinations for the purpose of propelling boats and vessels by the power of

[1] For Chancellor Livingston's account of the partnership, see Appendix, page 326.

[2] The original document is now in the possession of John Henry Livingston, Esq., of Clermont, by whose permission it is here first reproduced.

Steam Engines, and conceiving that their experiments have demonstrated the possibility of success, they hereby agree to make an attempt to carry their invention into useful operation, And for that purpose enter into partnership on the following conditions:

First: That a passage boat moved by the power of a Steam Engine shall be constructed at New York, for the purpose of navigating between New York and Albany, which boat shall not exceed 120 feet in length, 8 feet in width nor draw more than 15 inches water; that such boat shall be calculated on the experiments already made, with the view to run 8 miles an hour in stagnate water and carry at least 60 passengers allowing 200 pounds weight to each passenger.

Second: That a patent shall be taken in the United States of America in the name of said Fulton for a new mechanical combination of a boat to navigate by the power of a Steam Engine for which Patent the said Fulton shall deposit every necessary drawing, model, and specification, and when such patent is obtained, the property thereof shall be divided into One hundred shares, fifty of which shares shall be transferred to the said Livingston as his prop-

erty, and fifty shares shall be held by the said Fulton as his property, and all emoluments arising from said Patent in America, or from any extension of said Patent, or for any Patent premium or privilege in any other Country shall be equally divided, one half to the said Livingston, and one half to the said Fulton.

Third: That for the purpose of proving the utility of this invention by a fair experiment, the said Fulton agrees to go immediately to England, and there construct a boat and engine as near the dimensions and powers of the Steam Boat mentioned in Article the First as the Engine he may find will admit, which boat being for the purpose of experiment, it is presumed that a steam engine may be borrowed for that purpose; it is also estimated that if the experiment should not succeed, the loss on the different parts of the machinery together with the expenses of the said Fulton will amount to Five Hundred Pounds sterling, which sum the said Livingston agrees to furnish at any time or times which the said Fulton may think proper to draw for the same. And the said Fulton binds himself to pay to the said Livingston, one half of the expense which such experiment may cost, within two years from the

abandoning said enterprise, with interest for the same at seven per cent per annum. But should the experiment succeed to the satisfaction of the here contracting parties, the first object shall be to obtain a Patent in America and establish a passage boat to run to and from New York and Albany which work the said Fulton agrees to superintend, during which time his reasonable expenses shall be estimated as part of the general expenses of the establishment.

Fourth: And when such boat shall be in complete activity and the principle of navigating by Steam fully established, each of the here contracting parties may dispose of any number of their shares, *not exceeding forty shares*, that they may think proper; but the purchasers of shares, or share holders shall have no voice or command in conducting the business of the concern; but the number of boats, offices and agents shall be augmented or diminished as may be thought proper by the said Livingston and Fulton, nevertheless all augmentations and expenses shall be made out of the profits of the undertaking and not by a demand for advances on the part of shareholders, and the surplus

profits shall be divided twice a year in proportion to the shares, for which purpose the share holders or their agents shall be at liberty to examine the books during the first week of May and the first week of October in each year:

Fifth: And Whereas the duration of a Patent in the United States of America is for fourteen years, this partnership is made for fourteen years, or for any greater period to which the privilege in any of the American States can be extended, *But at any period over fourteen years at which the Patent expires in America,* the partnership shall cease also, And the whole stock of boats, warehouses or other property shall be considered the property of the share holders, who as a Company of proprietors will make such regulations as they think proper to govern their affairs, each share being a voice in such arrangement:

Sixth: And it is further agreed that in case of the death of the said Livingston or Fulton within fourteen years, or before the termination of the period specified for the duration of the partnership, each heir or assign who holds at least twenty shares shall be considered as an active partner, with full power to act in place

of the deceased, but as this arrangement may introduce two partners, Should two partners be introduced, the surviving primitive partner shall be considered equal to two voices, whatever may be the number of shares which he at such time may possess:

Seventh: And it is hereby agreed that the said Livingston may withdraw from this enterprise at any period he thinks proper, after the Five Hundred Pounds before mentioned shall be expended in the first experiment, but until he signifies to the said Fulton in writing, his determination to decline any further pursuit of the experiment he shall be considered as a partner in the undertaking.

(*Signed*) { Robert R. Livingston (LS)
{ Robert Fulton. (LS)

Witnessed by
(*Signed*) Robert L. Livingston.

The same terms were accepted in the letter written, in 1814, by the chancellor's heirs, wherein they affirm that "they will

always be ready and willing to comply with the Articles of Agreement entered into and executed by you [Robert Fulton] and the Honble. Robert R. Livingston." The chancellor left no son, and the paper is signed, "Robert L. Livingston and Edward P. Livingston."

A complete description of Fulton's trial boat on the Seine is contained in an interesting paper in present possession of the Hon. Peter Barlow, of New York, who inherited the family papers of his famous kinsman, Joel Barlow, former minister to France. The paper was prepared for Barlow's signature by Fulton himself, in the year 1811. When rival companies threatened to invade the patent rights of Fulton and Livingston, Fulton writes to Barlow:

I want your deposition as follows:

Joel Barlow of the City of Washington, district of Columbia, being duly sworn on the Holy

Evangelists of Almighty God, deposeth and saith: That in the year of our Lord, 1802, Robert Fulton at that time residing in said Barlow's house in Paris, did commence experiments with a view to discover the principles on which boats or vessels should be propelled through the water by the power of Steam engines,—that having made various experiments on a model about 4 feet long and 12 inches wide, which was worked by two Strong clock springs to ascertain the best mode of taking the purchase, whether by paddles, skulls, endless chains, or water wheels, he about Christmass 1802 gave the preference to a wheel on each side of the model,—and in the spring of 1803, in partnership with Robert R. Livingston, our then resident minister in France, did build a boat 70 French feet long, 8 French feet wide, 3 French feet deep, in which he placed a Steam engine of about 8 horses power, which was hired of Mr. Perrier for the experiment on this large scale, with the engine in the boat and one water wheel of about 12 feet diameter on each side of the boat, the power from the engine being communicated to the wheels by mechanical combinations which I do not recollect. In

July 1803 an experiment was made by the said Robert Fulton on the River Seine between the Pont Revolution and the Barrier de Chaleot [*sic*] in presence of a great number of people, and particularly Messrs. Volney, Carnot, Bossu and Proney, who were members of the National Institute appointed to examine the machinery. The speed of said boat on Still water was three miles and a quarter an hour, and on this velocity and the power of the engine I recollect that the said Robert Fulton, formed tables of resistances, powers and proportions, which he then shewed me and which he said should govern the construction of steamboats designed to run from 2 to 5½ or 6 miles an hour. I well recollect having mentioned to him that previous to the experiment on the large boat he had estimated a boat to be driven 16 or 24 miles an hour by the power of steam and his answer was that by the experiments he found so much power was lost in taking the purchase on the water that he was of opinion 5 or 5½ to 6 miles an hour in still water was as much as a boat could be propelled by any steam engine now known. In April 1804 the said Robert Fulton left my house for London:

while in England he purchased an engine of Messrs. Boulton and Watt which was shipped for New York while I was in London, and which as he has informed me is in the first boat that he built on Hudson's River, and which as he says drove the boat with the velocity which he had previously calculated it had the power of doing.

During my residence in Paris from the year [date not given] to 1804, I never heard of any other experiments on the Seine, to move boats by steam except the one made by the said R. Fulton. Previous to the year [ ] there was a project by Mr. Rumsey & one by fitch to establish steamboats on the Seine, but they were only projects which were never executed. A Frenchman of the name of Le Blanc, as I have been informed, made in 1803 some experiments on the Rhoan to navigate boats by steam which *failed.*

This document, in Fulton's own penmanship, is particularly important because it outlines his two experiments and gives some details never before known—first, that the engine for the experimental boat

on the Seine was hired from M. Perrier, who in 1774 built a vessel, and made an unsuccessful trial with steam-power on the Seine. He was probably the same man to whom Barlow refers in a letter, dated 1802, where he suggests that Fulton can try "relative velocities in Perrier's pond on the hill." In the same letter Barlow says:

> If your mind is satisfied perhaps it is not worth while, as Livingston seems to be satisfied with this part of the business. . . . He talked of forming a company etc. I wish that Parker or I had the money instead of him, tho' his influence in the State of New York would be energetic.

Other important facts set down in Barlow's deposition are Fulton's doubt about a possible attainment of speed, after his first disappointment, and the exact dimensions of the trial boat on the Seine.

In 1802, Fulton viewed the patent of M. Des Blanc, to which he refers in the

foregoing statement, and described his unsatisfactory impressions in his note-book, hitherto unpublished and now in possession of the estate of Cornelia Livingston Crary. He concluded, after he had inscribed a series of drawings and descriptive text, that two thirds of the steam-power which the Frenchman sought to apply to propulsion would be lost.[1]

Fulton also dismissed the possibility of Rumsey's device, and all others which had preceded his own. His biographer, Colden, writes that Rumsey had seen the failure of Fitch's enterprise, but Fulton "after a variety of calculations came to an opinion that this [Rumsey's] was the worst of all the methods which had been proposed."[2]

[1] See Appendix, page 328.

[2] Fitch drew water in through the bow, and forced it out through the stern. His boat, the prototype of Rumsey's, was ridiculed—his shareholders withdrew, one by one, from

As early as 1793, in a letter to Earl Stanhope, previously mentioned, Fulton defined his project to invent a new process of steam navigation. This highly important letter, never before published, is here presented through the personal courtesy of the present Earl of Stanhope, owner of the Fulton-Stanhope correspondence; two drawings are included, from Fulton's originals.

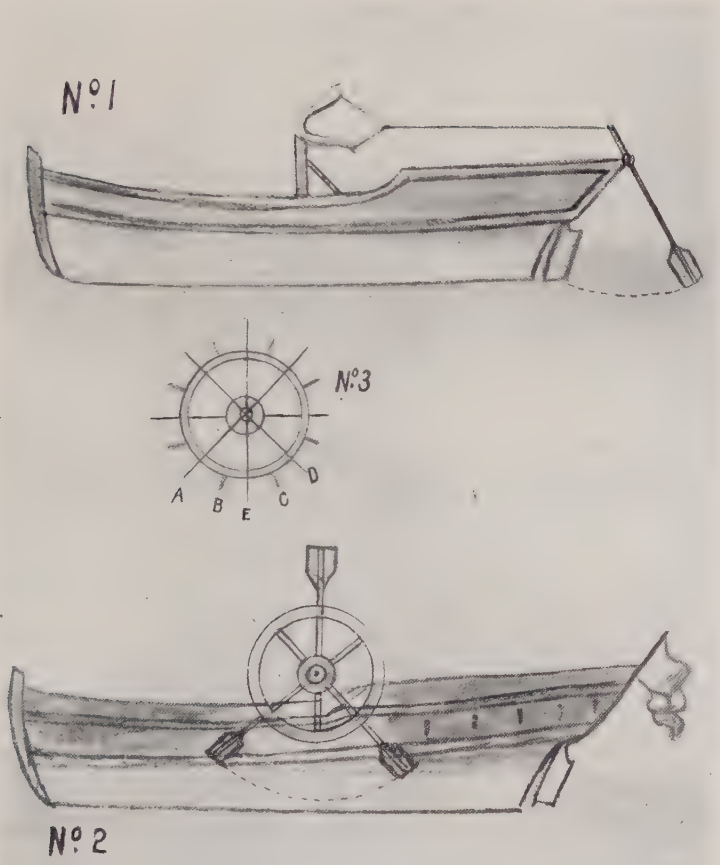
My Lord:

I extremely regret not having received your Lordship's letter in time to have the pleasure of an interview at Exeter as a Mechanical conversation with your Lordship would have been infinitely interesting to a young man. To atone for such loss and conform with your Lordship's

the Company, and Fitch in disappointment laid aside his boat in 1792. Rumsey's idea of propulsion was by means of a water pump, worked by a steam engine, which forced water through a channel from the bow and out at the stern, beneath the rudder. The impetus of the water, as it was forced through a square pipe, acted as an impelling power.

wish I have made some slight drawings descriptive of my Ideas on the Subject of the steamship which I submit with diffidence to your Lordship. In June '93 I begun the experiments on the steam ship: my first design was to imitate the spring in the tail of a Salmon,—for this purpose I supposed a large bow to be wound up by the steam engine and the collected force attached to the end of a paddle as in No. 1 to be let off which would urge the Vessel forward. This model I have had made of which No. 1 is the exact representation and I found it to spring forward in proportion to the strength of the bow, About 20 yards, but by the return of the paddle the continuity of the motion would be stoped. I then endeavoured to give it a circular motion which I effected by applying two paddles on an axis: then the boat moved by jerks. There was too great a space between the strokes; I then applied three paddles forming an equilateral triangle to which I gave a circular motion by winding up the bow. I then found it to move in a gradual and even motion 100 yards with the same bow which before drove it but 20 yards.

No. 2 is the figure of my present model, on



FULTON'S FIRST PLAN FOR STEAM NAVIGATION

Made in 1793, fourteen years before the launching of the *Clermont*. Now first published.

These drawings were sent by Fulton to the Right Honorable the Earl of Stanhope in November, 1793. This reproduction is from a copy in water-color sent to the author by the present earl. (See Fulton's letter, pages 129–134.)

which there are two equilateral triangles, one on each side of the boat acting on the same shaft which crosses the Boat or Ship and turns with the triangles. This, my Lord, is the line of experiment which led me to the triangular paddles which at first sight will convey the Idea of a wheel or perpendicular oars which are no longer in the water than they are doing execution. I have found by repeated experiment that three or six answer better than any other number as they do not counteract each other. By being hung a little above the water it allows a short space from the delivery of one to the entrance of the other, it likewise enters the water more on a perpendicular as the dotted lines will shew its situation when it enters and when it is covered the circular dots exhibit its passage through the water. Your Lordship will please to observe in the small wheel with a number of paddles A. B. C. and D. strike almost flat in the water and rise in the same situation whilst E. is the only one that pulls, the others act against it which renders the purchase fruitless; while E. is urging the Ship forwards B. A. is pressing her into the water and C. D. is pulling her out, but remove all the paddles except

E and she moves on in a direct line. The perpendicular triangular Paddles are supposed to be placed in a cast Iron wheel which should ever hang above the water, it will answer as a fly and brace to the perpendicular oars. This boat I have repeatedly let go and ever found her to move in a steady direction in proportion to the original purchase. With regard to the formation of ships moved by steam I have been of opinion that they should be long, narrow and flat at bottom, with a broad keel as a flat Vessel will not occupy so much space in the water; it consequently has not so much resistance. A letter containing your Lordship's opinion of this mode of gaining a purchase on the water and directed for me at the postoffice, Exeter, will much oblige your Lordship's most obedient and

Very humble servant,

ROBERT FULTON.

Torquay, November 4th,
1793.

The Right Honorable
The Earl of Stanhope.

The foregoing letter provides valuable historical proof of Fulton's early thought upon the problem which, fourteen years later, he carried to perfection, and of his individual conception of the theory of steam navigation; for he proposes an original method, unlike those preliminary experiments which he subsequently noted as inadequate. It is therefore evident that Fulton did not stumble by mere chance upon his formula of success. Numerous experiments preceded his ultimate discovery of proper proportions, which he tabulated in his "Tables of Resistance," the formula mentioned in Barlow's deposition.

One manuscript in possession of the Rev. Robert Fulton Crary, D.D., Fulton's grandson, to whom it was presented by his friend Philip Hamilton, Esq., son of Alexander Hamilton, describes with painstaking accuracy, in Fulton's own

writing, no fewer than six experiments in which Fulton tested his discovery with varying degrees of success. The paper is dated "Paris, the 19 Nevose, Anno II. January the 9th, 1803 [*sic*]," and is entitled "Experiments on the model of a boat to be moved by a steam engine."

A boat 3 feet long and 8 inches wide served as model. It was propelled by two strong clock springs, and Fulton made a comparative table to denote gradations in power, and the progressive distance gained in each test. He concluded that "large paddles would be unwieldy and inconvenient, hence for the large experiment it will be best to commence with paddles which present about twice the surface of the boat's bow reduced to flat resistance. . . . The power of the steam engine is 1500 pounds running two miles an hour, or equal to 3000 lb. running 1

mile an hour. Thus the 3000 pounds ought to draw her 12 miles an hour."

It will be noted that at this point Fulton felt himself master of the situation, and that, throughout all his manœuvers, he contemplated the introduction of his patent in his native land is indisputably shown by many references. A sketch of a steamboat with two side paddles was made on June 5, 1802, while Fulton at Plombières was experimenting with his submarine contrivances for the French government. It is entitled, "The Steamboat from New York to Albany in 12 hours," and is in the estate of Fulton's daughter, Cornelia Livingston Crary. As a preface to the detailed experiments which follow, Fulton asserted:

Propelling a boat through water is the act of separating two bodies—the boat from its oars or paddles, or whatever else is applied—

and this is governed by laws reducible to simple calculations.

A number of pictured tests demonstrate his mode of application. Then he includes a description of the trial trip at Plombières:

The model being arranged a small rivulet was stopped so as to form a stagnant pond 66 feet long, 9 or 10 feet wide and from 3 to 2 feet deep at the upper end; thus prepared and with a good watch which beat the seconds, the experiments were commenced.

Five detailed demonstrations follow, and Fulton says:

As there is much space in this boat I will add to her velocity by making her go 12 miles an hour instead of 8—the additional weight of this engine will be about 3 tons making in total 21 tons, having 23 tons for passengers equal to 230 at 200 lbs for each this boat would make the voyage [from New York to Albany] in 14

hours instead of 20 as there would be 6 hours saved in time it would merit a dollar extraordinary in the price. The expense of such a boat in coals and men would not be 25 dollars a day. Suppose then that the commerce between New York and Albany can give to such a boat 150 passengers per day at 3 dollars each, the amount would be 450 dollars. Hence it seems advisible to go quick, carry cheap, and thus avoid the competition of boats with sails or carriages.

These hitherto unpublished words contain the first recorded prophecy of the great Hudson River Day Line.

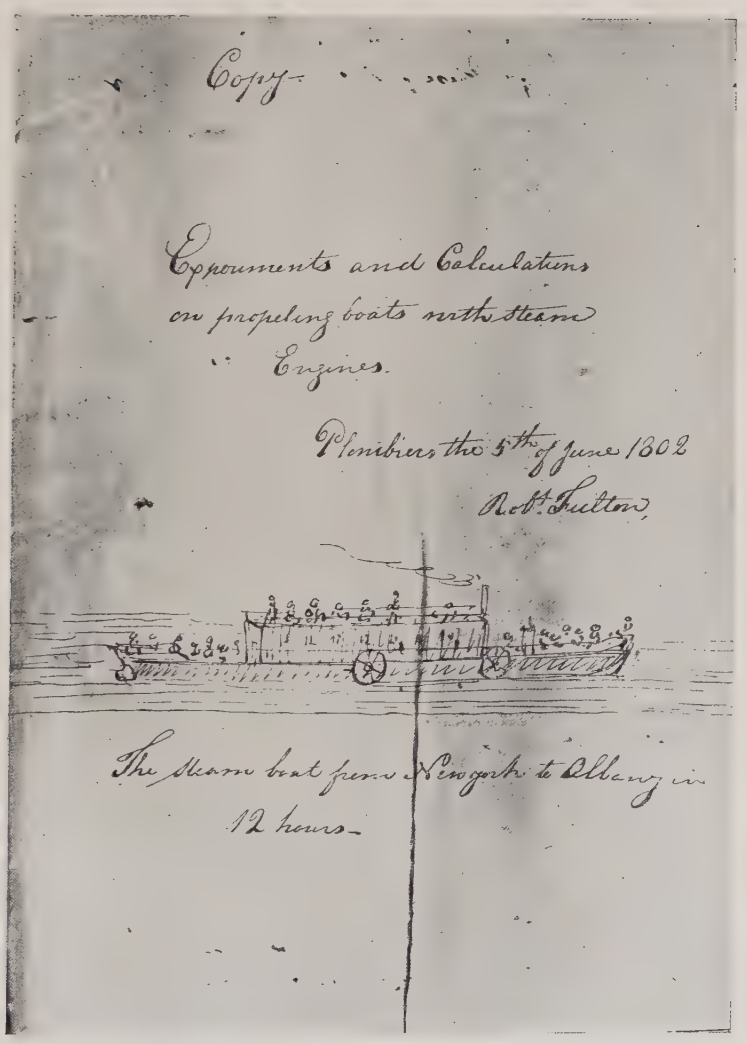
Fulton's foresight extended farther even in that day of unrealized possibilities. His next record is a "Note on running 16 miles an hour." This speed cannot be accomplished in small boats, he decides:

For great speed requires great power and a large and heavy engine. But suppose a boat 12 feet wide and 200 feet long, drawing one

foot of water. She would displace 2000 cube feet or 68 tons to drive such a boat 16 miles an hour will require 9216 lbs purchase. . . . Suppose 200 (passengers) at 3 dollars each or 600 dollars—Such a boat would make the voyage in 10 or 12 hours. In which time the Engine would not burn more than 3 tons of coals worth perhaps 15 dollars, expense of men perhaps 5 dollars, total 20. To go 16 miles the chains must run 24 miles or 36 feet a second. The engine makes 3—the multiple then is 12 to one. Here it is worthy of observation that as the boat and engine increases in size, the expense in proportion to their passengers is diminished in the first and small boat which carries only 50 persons their expense is 10 dollars. This is twenty cents each and the time 20 hours.

Second boat—230 persons—the Voyage 14 hours—the expense 25 dollars—this is about 11 cents per person.

In the third boat which goes the Voyage in 12 hours and carries 380 persons, the expense, say 30 dollars, or 8 cents per person. The reason of this is the difference in the squares of the boats. A boat 6 feet wide and 90 feet



FULTON'S FIRST PROPHECY OF STEAM NAVIGATION ON THE HUDSON

This sheet is the title-page of the inventor's note-book of his experiments. It is in the possession of the estate of Fulton's daughter, Cornelia Livingston Crary, and has never before been published.

long is only 14 tons whereas a boat 12 feet wide only twice the resistance of the first, will carry near 5 times the burden or 68 tons and instead of 50 will carry 380 persons which is 7 times the number and this enables one to add to the power and velocity of the engine yet carry cheaper than in the first case.

ROBT. FULTON.

It should be observed that these prophecies antedated the experiment which Fulton made, at a joint expense with Livingston, on the Seine in 1803.[1] Their trial boat was seventy feet long, eight feet wide, and of light draft. The hull proved too weak to bear the weight of the machinery, and the boat snapped in two and deposited the engine in the river-bed. The enterprise, because of this strange mishap, was viewed with public disfavor,

[1] A receipt, signed by Fulton on 17 Ventose, An 11, shows that he had received from the Chancellor in nine payments, a total of 11,000 francs—the Chancellor's half-share of the expense.—In "*The Livingstons of Callendar.*"

and probably influenced the adverse decision of Napoleon's savants, who condemned its utility.

The preceding January, 1803, Fulton had formally offered his steamboat to the consideration of a Government commission, and the First Consul appointed three members of the Institute to study its merits. Fulton's original letter, in French, is on file in the Conservatoire des Arts et Métiers in Paris, together with his accompanying drawing.[1]

The unfortunate accident which postponed the official trial trip from the early spring of 1803 to midsummer, brought to Fulton, according to his own confession, a despondency which he never felt on any other occasion of his life. After a restless night, he was precipitately visited by a messenger, who exclaimed:

[1] See Appendix, page 333.

"Oh, sir, the boat has broken in pieces and gone to the bottom!"

This disturbing news was literally true. Fulton rushed to the spot, and labored for twenty-four consecutive hours, without rest or refreshment, to raise the boat to the surface. The machinery was comparatively uninjured, but the boat was so wrecked that it had to be virtually rebuilt. The imprudent exposure and the labors incident to the struggle for the recovery of the invention produced a permanent constitutional weakness of the lungs which resulted in Fulton's subsequent delicacy to the close of his life. The vivid description of the accident which Colden, Fulton's biographer, has given, is corroborated by Dr. Edward Everett Hale in his "Memories of a Hundred Years" through an interview with Edward Church, an American, who was with Fulton in

France, and an eye-witness of the event. These records amply refute a rumor, current through Paris at the time, that Fulton himself had purposely sunk the boat because chagrined and disappointed by the continued inactivity and lack of appreciation of the Napoleonic commission.

The reconstruction of the boat occupied several months, and not until July was it again in readiness for the official demonstration. Joel Barlow and Robert Fulton had a friend, Fulner Skipwith by name, who, during the preceding year of 1802, had written to Fulton asking the details of patent laws in France. Fulton wrote his reply from Paris, which is given in the Appendix.

When the postponed trial trip was about to take place, Fulton wrote again to Mr. Skipwith, with whom his friendship had increased. Mr. Skipwith had been

married in Paris, while Fulton was experimenting upon the French coast, and in 1802 his first child was born. Fulton's merry letter of invitation should be read in the light of this recent happy experience to be fully understood:[1]

Paris, the 5th Thermidor, Anno 11
(24 July, 1803)

Mr. Skipwith,

My dear friend, You have experienced all the anxiety of a fond father, on a child's coming into the world. So have I. The little cherub, now plump as a partridge, advances to the perfection of her nature and each day presents some new charm. I wish mine may do the same. Some weeks hence, when you will be sitting in one corner of the room and Mrs. Skipwith in the other, learning the little creature to walk, the first unsteady step will scarcely balance the tottering frame; but you will have the pleasing perspective of seeing it grow to a steady walk and then to dancing. I wish mine may do the

[1] Original in possession of C. H. Hart, of Philadelphia.

same. My boy, who is all bones and corners, just like his daddy and whose birth has given me much uneasiness, or rather, anxiety,—is just learning to walk, and I hope in time he will be an active runner. I therefore have the honour to invite you and the ladies to see his first movements on Monday next from 6 till 9 in the evening between the Barrière des Bons Hommes and the steam engine. May our children, my friend, be an honour to their country and a comfort to the gray hairs of their doting parents.

Yours

R. Fulton.

The trial of the boat followed, and was accounted a success, although the desired speed was not attained.

A contemporaneous account published in the "Recueil Polytechnique des Ponts et Chaussées": Paris, 1803, was reprinted in "Cassier's Magazine," and may well be accorded prominence, as the best account to be obtained:

On the 21st Thermidor[1] a trial was made of a new invention of which the complete and brilliant success should have important consequences for the commerce and internal navigation of France. During the past two or three months there has been seen at the end of quay Chaillot, a boat of curious appearance, equipped with two large wheels, mounted on an axle like a chariot, while behind these wheels was a kind of large stove with a pipe, as if there were some kind of a small fire engine (pompe à feu) intended to operate the wheels of the boat. Several weeks ago some evil-minded persons threw this structure down. The builder, having repaired this damage, received, the day before yesterday, a most flattering reward for his labour and talent.

At six o'clock in the evening, aided by only three persons, he put his boat in motion with two other boats attached behind it, and for an hour and a half he produced the curious spectacle of a boat moved by wheels, like a chariot, these wheels being provided with paddles or flat plates, and being moved by a fire-engine.

In following it along the quay, the speed

[1] August 9, 1803.

against the current of the Seine appeared to us about that of a rapid pedestrian, that is, about 2,400 toises [1] an hour; while in going downstream it was more rapid. It ascended and descended four times from Les Bons-Hommes as far as the pump of Chaillot; it was manœuvered with facility, turning to the right and left, came to anchor, started again, and passed by the swimming school.

One of the boats took to the quay a number of savants and representatives of the Institute, among whom were Citizens Bossut, Carnot, Prony, Perrier, Volney, etc. Doubtless they will make a report which will give to this discovery all the éclat which it merits; for this mechanism, applied to our rivers, the Seine, the Loire, and the Rhone, will have most advantageous consequences upon our internal navigation. The tows or barges which now require four months to come from Nantes to Paris, would arrive promptly in ten to fifteen days. The author of this brilliant invention is M. Fulton, an American and a celebrated mechanic.

[1] The *toise* was an old French measurement = 6.395 English feet.

In this first success, Fulton was mindful of the needs and opportunities for steam navigation in America. To this end he wrote, during the same month, August, 1803, to Boulton & Watt of England to order a steam-engine for a boat to be launched in America:[1]

Paris, 6th August, 1803.

GENTLEMEN:

If there is not a law which prohibits the exportation of steam engines to the United States of America, or if you can get a permit to export parts of an engine, will you be so good as to make me a cylinder of 24 horse power double effect, the piston making a four foot stroke; also the piston and piston rod.

The valves and movements for opening and shutting them.

The air pump piston and rod.

[1] The letter, now in possession of George Tangye, Esq., of Birmingham, England, was recently appended to the presidential address of Mr. John Ward at the Session of the Institution of Engineers and Ship-Builders in Scotland.

The condenser with its communications to the cylinder and air-pump. . . . etc.

The other parts can be made in New York, and as it will save the expense of transport, and they require a particular arrangement which must be done while I am present, I prefer to have them done there. Therefore if it is permitted to export the above parts you will confer on me a great obligation by favoring me with them, and placing me the next on your list. . . .

When finished please to pack them in such a manner as not to receive injury, and send them to the nearest port, which I suppose is Liverpool, to be shipped to New York to the address of Brockhurst Livingston, Esq. The amount of the expenses will be placed to your order in the hands of George William Erving, American Consul, Nicholas Lane, Lombard Street, No. 10, London. The situation for which this engine is designed, and the machinery which is to be combined with it, will not admit of placing the condenser under the cylinder as usual, but I hope the communicating tube to the condenser will not render the condensation less perfect or injure the making of the engine.

Should you find a difficulty in getting a permit to export the parts above mentioned, I hope to be able to obtain it through our Minister, Mr. Monroe. And as there is some difficulty in passing letters to and from Paris and Birmingham, which may lose much time, you will be so good as to furnish me the above parts as soon as possible without waiting to hear further from me.

Please to write as soon as possible under cover to Mr. Erving as before mentioned. In which I beg you to answer the following questions:

What must be the size of the boiler for such an engine?

How much space for the water and how much for the steam? What is the most improved method of making the boiler and economic mode of setting it? How many pounds of coal will such an engine require per hour, and what is the expense at Birmingham?

Can you inform me what is the difference in heating with coals or wood, as in most cases wood must be used in America; and must not the furnace be made different when wood is to be used?

What will be the consequences of condensing with water salt, as in places where the engine is to work the water is brackish?

What will be the interior and exterior diameter of the cylinder and its length, and what will be the velocity of the piston per second? This information will enable me to combine the other parts of the machinery.

When can the engine be finished, and how much will be the expense? Your favoring me with the execution of this order, and answering the above questions will much oblige

Your most obedient servant,

ROBERT FULTON.

Rue Vaugirard, No. 50 Paris.

Can the position and arrangement of the cylinder condenser and air-pump be adhered to as in the drawing, without injuring the working of the engine?

This is the first authentic order of the engine for the *Clermont,* but it was not the last, for the opposition which Fulton

expected in gaining permission of transport was duly encountered. Boulton & Watt declined the order on October 4, 1803, as they had been unable to obtain permission to forward the engine to America. The following month, Fulton's hope revived, and he wrote, as he had planned, to the Honorable James Monroe, who was at that time American minister at the Court of St. James. The letter is preserved at the Lenox Library, New York.

Amsterdam, November 3rd, 1803.

His Excellency James Monroe:

Sir: You have perhaps heard of the success of my experiment for navigating boats by Steam Engines; and you will feel the importance of establishing such boats on the Mississippi and other rivers of the United States as soon as possible. With this view I have written to Messrs. Boulton & Watt of Birmingham, to forward me a steam engine to America. They

answer that they cannot export the engine without the permission of Government. I therefore beg of you to apply to Government for permission for you to ship a Steam Engine of a 24 horse power to New York. It will be well to ask this permission for yourself without mentioning my name, as I have reason to believe Government will not be much disposed to favour any wish of mine.[1] Messrs. Boulton has a House of Agency [in] London Street in the City, who will inform you what office to apply to. And Mr. Huntingdon, a young gentleman who left this [place] some days ago will call on you, or may be heard of at Mr. Erving's [American Consul] will go to the offices with your request and transact the business for me, but perhaps your best and shortest mode will be to apply direct to Lord Hawksbury. Your desire to see useful arts introduced or created in our country is the strongest reason for your urging the permission and accepting no refusal; —the fact is I cannot establish the Boat without the engine. The question is then,—shall

[1] The British ministry were watching Fulton's offer to the French Government of the submarine vessel *Nautilus* (see page 79).

we or shall we not have such boats? Please to write me under cover to Mr. Livingston as soon as possible the result of your application. . . .

ROBERT FULTON.

P. S. For greater safety I take the liberty to inclose in your letter one for Boulton & Watt, which you will be so good as to order into the Post Office, and when you obtain the permission send it directly to them. I should apologize for this trouble, but that I have no hope of success but through your goodness.

The letter to Boulton & Watt was inclosed, but bears no mark of post. Perhaps Mr. Monroe decided that America did not want such boats, perhaps he hesitated to interfere in a matter where permission had already been refused to a young enthusiast. The letter to the engine-builders (which is in the Lenox Library) briefly reiterated the former order.

There is a strange pathos in the inex-

plicable delays which postponed the important invention. Presumably Fulton had no reply from Mr. Monroe, for he wrote to him again, from Paris, November 17 [1803], renewing his request. He says in part:

> I wrote you on the 3rd inst from Amsterdam, and two letters afterwards from Rotterdam on a subject which a good conveyance gives me an opportunity to repeat. Having succeeded in my experiment for navigating boats by steam, I wrote to Messrs Boulton, Watt & Company of Birmingham to forward me a steam engine to America. They write me in answer they cannot export the engine without the permission of Government. etc.

No action followed, and Fulton, who had returned to England in May, 1804, made a personal attempt to gain the governmental permission of export. At the same time he was busy urging his torpedo

project upon the British ministry; he tarried in London and spent his days in eager anticipation of the great decision. Barlow and his wife were *en route* to America after their long sojourn in France, where Fulton had for seven years shared their home. Fulton wrote for their passport through London, and took this, and every opportunity, to get the engine for the first steamboat in America:[1]

London, Story Gate Coffee House,
the 30th of May, 1804.

Mr. Hammond will have the goodness to obtain from Government permission that Mr & Mrs Barlow may pass through London on their way to America, to which they purpose to sail in August, the object is to consult the London physicians on Mr. Barlow's health.

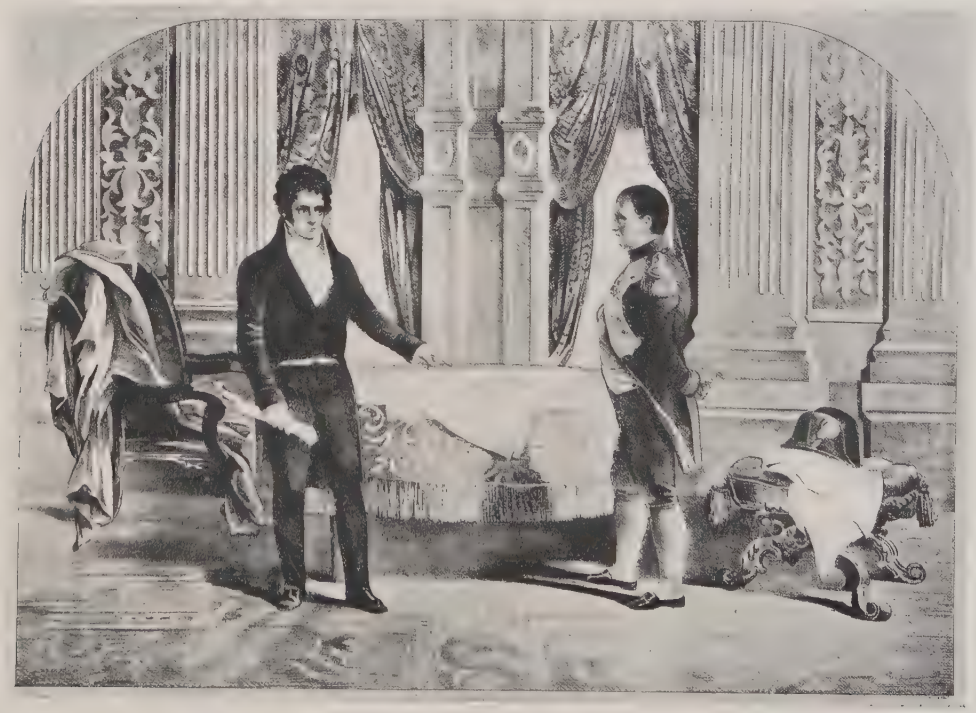
[1] His letter, which is in possession of the estate of Cornelia Livingston Crary, Robert Fulton's daughter, has never before been published.

Whatever reasons Government might have to be displeased with Mr. Barlow, I am convinced that they will find no umbrage in his present sentiments and tranquil disposition. His late writings to prove the happy effects of British, in preference to French, colonization by ex-

DESCRIPTION OF ILLUSTRATION ON FACING PAGE

Below the title is printed the following: "Robert Fulton, Inventor of Steam Navigation, exhibiting his plans to Napoleon Bonaparte, 'Great Man,' says Fulton, 'if you will give me your support to put these plans into execution, you can have the largest and most powerful Navy in the World.' This invention, however, appeared so extraordinary to Napoleon at the time that he could not conceive it practicable; yet, from the forcible impression it made upon his mind, he deemed it expedient to lay the particulars before the Academy of Sciences in Paris for their serious consideration. The following was the reply of the Academy of Sciences to Napoleon, 'Sire, we have effectively found a motive power in steam, but of a nature comparatively so feeble that a child's toy could hardly be put in motion by it.' Such was the reply of these sapient Academicians. Nor was it again until Napoleon beheld from St. Helena a steamship that he remembered the words of Fulton, and perceived how grossly the Academy of Sciences had been mistaken."

The above indicates that the lithograph (made in Philadelphia) was executed after the death of Napoleon in 1821. Fulton died four months before the battle of Waterloo. This picture, from the only copy known, is owned by Mrs. Hermann H. Cammann.



AN AMERICAN LITHOGRAPH ENTITLED, "FULTON AND NAPOLEON IN 1804"

(*See opposite page for description*)

tending the arts, civilization and liberal ideas, are worthy your admiration.

I also beg permission to ship one of Mr. Watt's Steam engines to New York for the purpose of carrying into effect an experiment in which I have fortunately succeeded,—that of navigating boats against currents of not more than 4 miles an hour, hence calculated for most of our rivers. Your Government must be sensible that every improvement which may tend to augment the produce of industry in America, creates the means of paying for British manufactures, increases the demand and adds to the wealth of England. The time will come when America alone will take more of your manufactures than you now diffuse over the whole globe, and is to give you a perspective of immense wealth, which it is your interest to nourish.

I hope Government will see nothing impudent in these two requests. I shall esteem it a favor if they are granted.

The letter to Mr. Erving, American Consul, is also on record. It was indorsed

by Mr. Barlow, who aided Fulton at every turn. In February of 1804 he traveled to Birmingham to personally order the engine, and in January, 1805, made a payment of £548, English money, for it. But not until March was the actual permission granted, when Fulton paid his treasury fee, £2, 14, 6, on receiving permission to ship the engine to America.

There is no doubt that Fulton contemplated an early return to America, when he left France in 1804, but he was detained by the negotiations with the British Government which repeatedly buoyed him to expect an acceptance of his torpedo project. Four days after his arrival in England he wrote to Thomas Jefferson, then President of the United States, as follows:

London, May the 23rd, 1804.[1]

His Excellency Thomas Jefferson:

Sir: On arriving in England I find I shall be detained some weeks longer than I first calculated. I therefore forward your letters committed to my care in Paris. I am, Sir, with profound respect,

Your most obedient,
Robert Fulton.

Successive disappointments ensued. Fulton, in touch with the English statesmen of the day, continued as a neutral observer to study international conditions. Determined to return to America as soon as possible to establish his project of steam navigation, he was equally determined, if persuasion and demonstration would make it possible, to interest and engage the British navy in his torpedo proposition.

[1] From Jefferson Papers, Series 6, Vol. IX, No. 211. Library of Congress.

Letters to many contemporary men of state show that the chief impulse of his mind was to establish his plan for universal peace.

Finally, in 1806, the British ministry rejected his project of the submarine torpedo. Fulton immediately set about to arrange his affairs for the return to America. He wrote to Mr. Parker, a friend, during September, 1806:

My dear Parker,

On the 29th I sail for New York. Some time ago I begged of you to purchase any kind of American funds with the 1927£ in your hands, and to forward them to Gen'l Mason to be transferred into my name. You will have the goodness to do this as soon as possible, as I and my friend [Barlow] will need all our means to settle down comfortable. Believe me, my dear friend, how sincerely I love and esteem you and how much it would add to the pleasure

of our Athenian Garden in America, to have you living on the margin of it.

Truly

R. F.

Fulton's perplexities with the British ministry, great as they proved, were not the only affairs which engrossed his mind and delayed his return to America. Evidence is given in a letter from Joel Barlow, who has been termed "an adopted father" in devotion to Fulton, that Fulton then contemplated marriage with an English widow of large fortune. The letter, intimate and confidential, is a perfect example on Barlow's part of loyal friendship and affectionate counsel. It has never before been published, and extracts which seem to be of public interest are here given:

tions. My taste is so decided for simplicity and moderation, that it would spoil me, whatever it did you, to be the slave of a splendid income. I hope the Fox Administration [then in consideration of Fulton's Torpedo Project] will settle with you liberally and let you off. And in your case, I would not demand a great sum, neither would I have it by way of annuity. But this affair must depend on your taste, and is perhaps an improper subject of advice.

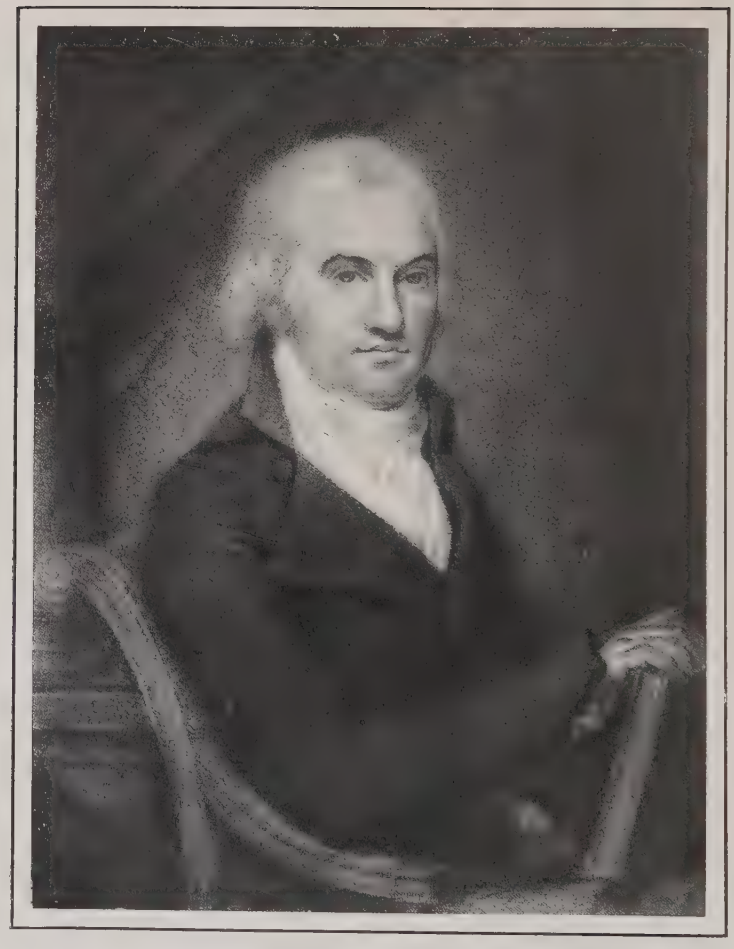
My heart is so full of these subjects that I cannot write upon any other by this occasion which is probably by the April packet from New York.

Adieu, my excellent friend.

[Joel Barlow.][1]

It is not known how far the attachment had progressed. We only know that Fulton, unmarried, returned to America six months later and immediately engaged in great activity toward the development of his two inventions.

[1] Letter in possession of Judge Peter T. Barlow.



JOEL BARLOW

Executed at the same time as the portrait of Fulton. Owned by Judge Peter T. Barlow.
From the pencil drawing by John Vanderlyn

In September, 1806, Fulton had written to Mr. Barlow, who was then enjoying the delights of his new country-place "Kalorama," near Washington, to which Fulton had previously alluded as "the Athenian Garden in America":

My arbitration [with the British ministry] is finished, and I have been allowed the £10,000 which I had received, with £5000 salary, total £15,000, though £1600 which I have received on settling accounts will just square all old debts and expenses in London and leave me about £200. My situation now is, my hands are free to burn, sink, and destroy whom I please, and I shall now seriously set about giving liberty to the seas by publishing my system of attack. I have, or will have, when Mr. Parker sends my two thousand pounds, 500 sterling a year, with a steam engine and pictures worth two thousand pounds. Therefore I am not in a state to be pitied. I am now busy winding up everything and will leave London about the 23rd inst. for Falmouth, from whence

I shall sail in the packet the first week in October, and be with you, I hope, in November, perhaps about the 14th, my birthday, so you must have a roast goose ready. Do not write me again after receiving this. The packet, being well manned and provided, will be more commodious and safe for an autumn passage, and I think that there will be little or no risk, yet accidents may happen, and that the produce of my studies and experience may not be lost to my country, I have made out a complete set of drawings and descriptions of my whole system of submarine attack, and another set of drawings with description of the steamboat. These, with my will, I shall put in a tin cylinder, sealed, and leave them in the care of General Lyman, not to be opened unless I am lost. Should such an event happen, I have left you the means to publish these works, with engravings, in a handsome manner, and to which you will add your own ideas—showing how the liberty of the seas may be gained by such means, and, with such liberty, the immense advantages to America and civilization: you will also show the necessity of perfecting and establishing the steamboat and canals on the inclined

plane principle. I have sent you three hundred complete sets of prints for the "Columbiad" by the Orb, directed to Mr. Tolman, New York, value £30. As the transport by land to Philadelphia will not be much, I have sent them by this opportunity, that they may arrive before the law for prohibiting such things is in force, and that the shipment and risk may not approach too near to winter. All my pictures, prints, and other things I mean to leave here, to be shipped in spring vessels, about April next, when the risk will be inconsiderable. How shall we manage this winter, as you must be in Philadelphia for the printing, and I want to be at New York to build my boat? I am in excellent health, never better, and good spirits. You know I cannot exist without a project or projects, and I have two or three of the first order of sublimity. As all your prints are soldered up I do not see how I can leave the number you desire with Phillips, [the London publisher] but as I leave the plates with Mr. West the necessary number can be struck off when the sheets arrive. We will talk of this in America. Mr. West has been retouching my pictures: they are charming.

Fulton, upon his arrival in America, speedily joined Barlow in Kalorama, this delightful retreat which was termed the "Holland House of America"; Charles Burr Todd, Barlow's biographer, states that "Fulton lent his genius to the task of embellishing the house and grounds, there being in one of his letters of the period a drawing for a summer-house which he intends 'for the grounds of our mansion,'" as he called it. It is said that Fulton constructed a model of the *Clermont* at Kalorama and tested its powers on the waters of Rock Creek. Be that as it may, we know that he contrived to gain inspiration from the bonds of closest affection with Barlow, who was a man of rare liberality of mind.

Fulton's characteristic optimism was again speedily illustrated. With a sublime disregard for the fact that his torpedo

project had been dismissed by two important governments, France and England, he immediately offered to America his plan for this destructive machine, designed to provide a weapon sufficiently strong, in the hands of a righteous nation, to maintain universal peace.

His offer was favorably considered by President Jefferson, and in the presence of Naval experts, Fulton publicly demonstrated its power by blowing up a brig in the harbor of New York, July 20, 1807, less than a month before the successful voyage of the *Clermont.* Subsequently (1814) Fulton was authorized by Congress to build the first steam war vessel of the world, the *Demologus,* also known as *Fulton the First.*

Truly could Robert Fulton say that he had "two or three projects of the first order of sublimity." His area of useful-

ness was as wide as the world; his theory of peace included all nations; and with true American spirit he illustrated,—by his advocacy and improvement of Canal Navigation, and by his inventions of the Submarine Torpedo and the Steamboat,—his great original motto, "The Liberty of the Seas will be the Happiness of the Earth."

PART IV

THE "CLERMONT"

AN adequate recital of Robert Fulton's achievements has never been written, nor can it be until some fellow-craftsman, having access to Fulton's papers, sets forth the technical progress of his inventive power, which successively produced a machine for cutting marble, a machine for spinning flax, the double inclined plane for canal navigation, a machine for twisting rope, an earth-scoop for canal and irrigation purposes, a cable-cutter, the first French panorama, the submarine torpedo boat, and several minor canal improvements,—all predecessors of his greatest invention, the steamboat.

When to this creditable list is added a

record of his numerous paintings[1] and miniatures, and his far-sighted writings, "A Treatise on Canal Navigation," "Torpedo Warfare," his "Essay to the Friends of Mankind," and his "Submarine Navigation," and another essay entitled "Thoughts on Free Trade," a cause for which he was an ardent advocate, and when it is remembered that he died at the age of fifty, there comes a sense of wonder that so short a working span could yield products so many and so diverse.

Washington Irving, in the zenith of his fame, was asked by members of Fulton's family to write a biography of the inventor. After a tentative endeavor Mr. Irving gave up the undertaking. In 1878 a subsequent biographer, J. F. Reigart, in a hitherto unpublished letter to Fulton's grandson, the late Robert Fulton Blight,

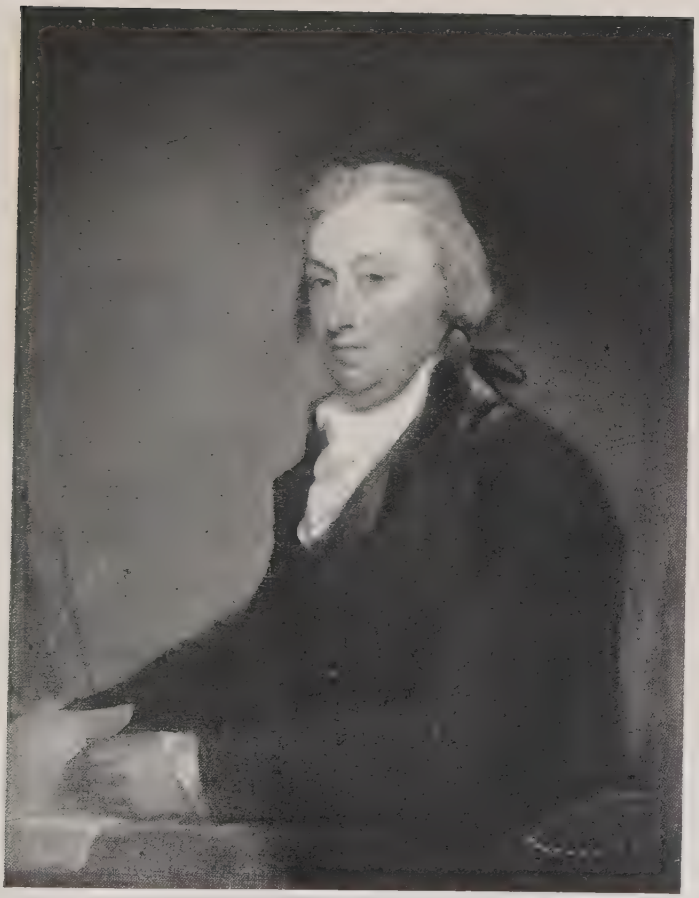
[1] See Appendix, pages 354–356.

recorded Irving as having said that "Fulton's works were already immortal monuments upon the waters of the globe, and ornamented every city and public road of the land. He could not possibly procure correct drawings or illustrations of Fulton's mechanical inventions, and if he did, he had not the ability to specify or describe them; and to write a grand eulogy or literary essay would not be a correct biography of the greatest of inventors."

A similar deterrent prevented his daughter from accomplishing a like desire. Cadwallader Colden, who wrote a life of Fulton, stated that the inventor had intended to write an autobiography but was too occupied with scientific work. It has remained, therefore, at the close of a century, for his great-granddaughter, although less qualified than her predeces-

sors, to take up the delayed work of transcribing his family papers and to fulfil Barlow's prophecy made in 1800 that he "would take care that it [Fulton's patience] shall not be forgotten by the writer of your life, who I hope is not born yet."

Upon his arrival in America from England in December, 1806, after a voyage of two months from Falmouth, Fulton immediately devoted himself to his several projects. The winter was passed in the construction of the American boat, which he called the *Clermont* in gracious recognition of the hospitality which he had enjoyed at Chancellor Livingston's country-place of that name on the Hudson. He engaged Charles Brownne, a shipbuilder of note, whose yards were at Corlear's Hook on the East River, to construct the hull. Already Fulton had ex-



CHANCELLOR ROBERT R. LIVINGSTON

From the painting by Gilbert Stuart, dated 1795. Owned by John H. Livingston, "Clermont," Tivoli, New York

pended a considerable sum of money upon the project, for we find in his note-book[1] the following items:

February 5, 1804

Travelling from London to Birmingham and back again to order the steam engine . . .	£8 – 0 – 0

Jan. 21, 1805

To Messrs. Boulton Watt & Co. for cylinder and parts of the engine	£548 – 0 – 0

March 18, 1805

To Messrs. Cave & Son, for Copper Boiler weighing 4,399 lbs at 2s. 2d. the lb. . . .	£476 – 11 – 2

March, 1805

Fee at the Treasury on receiving permission to ship the Engine for America	£2 – 14 – 6

[1] In possession of Robert Fulton Ludlow.

The entry relative to the copper for the boiler refutes the legend, once current, that the boiler of the *Clermont* was made from copper pennies melted down. Early coins were worth their face value as metal, and collectors suppose that the rarity of certain issues of currency is due to the fact that the easiest and least costly way to procure copper, when the metal was needed for useful devices, was to melt coins. The story apparently arose from the extreme rarity of copper cents of the coinages of 1799–1804.

It has been asserted that the engine, after its arrival from Birmingham, lay for six months in charge of the New York Custom House before Fulton could raise the money to pay the duties, but the cause of delay may have arisen from the fact that the boat was not ready to receive the machinery. Finally it was stored at a

Mr. Barker's warehouse, for we find an entry in Fulton's account book, on April 23, 1807, of £5 "to the carriage of the engine from Mr. Barker's to the Boat." It is not known at what date the engine arrived in America, but it was in Mr. Barker's warehouse on South Street for several months prior to its erection in the boat. From the grandchildren of Mr. Barker's daughter, Mrs. Hunt of New Orleans, it is learned that Fulton invited Mr. Barker to accompany him on the first trip of the *Clermont,* and that Mr. Barker not only enjoyed the novel sensation but secured permission to take with him his little daughter Sarah, who ever after remembered her delight over the strange adventure. It is said that she was so tiny that she sat upon a plank stretched across the stern of the boat.

"FULTON'S FOLLY"

PRIOR to the completion of the *Clermont,* a throng of idle-minded men congregated in the vicinity, called it "Fulton's Folly" and scoffed at its possibilities. The actual safety of the invention was seriously menaced by this lawless throng and by the careless piloting of sloops in the slip. After one threatened mishap, Fulton found it necessary to guard the boat. On June 7, he paid "$4.00 to the men for guarding the boat two nights and a day after the vessel ran against her," and six days later "$20.00 Pay to the men who guard the boat."

These are some of the other disbursements copied from the inventor's notebook:

April 23, 1807, To John Cunningham, for planks for fly and wheel spokes . . . $23.43

May the 7,	To Mr. Jackson for sheet iron for the chimney . .	$26.25
May 15,	To Mr. Brownne	400.00
June 3,	To Mr. Maxwell, for work done to Boiler	200.00
June 8,	To a wooden pump, Thomas Smith	7.71
June 16,	To plank for the bottom of the boat	15.00
June 18,	To Mr. Martin, Brass Founder	50.00
	Pair of Sweeps	4.00
	To Peter Coruth, for iron braces for the boiler . . .	22.00
June 8,	Chaldron of Coal	100.00
June 26,	To Mr. Brownne, for workmen's wages	30.00
Aug. 1,	To a stone float in the boiler	1.75
Aug. 10,	Mr. Cunningham, for hickory plank	8.38
	James Trie, final settlement	10.00

Other interesting expenditures for the fittings of the *Clermont* follow:

Aug. 10,	To a North River man for the loan of an anchor . .	2.00
	Iron monger's bill	10.60

	Dishes and plates	$4.00
Aug. 12,	Water Casks	3.00
Aug. 15,	Wine, sugar, brandy . . .	3.00
	Mr. Johnson, the Mason . .	40.00
	Mr. Brownne, (the Ship Builder)	50.00

FINANCIAL DIFFICULTIES

Only a few weeks before the completion of the boat the funds provided by Livingston and Fulton threatened to become exhausted and they invited a third party to join the enterprise but no one was found who was sufficiently convinced of the utility of the plan, and they remained alone in the proprietorship. Fulton has left a record of a previous attempt to obtain coöperation. He says: "In 1806 Messrs. Livingston and Fulton offered to take Mr. Stevens in as a partner. He refused, asserting that Mr. Fulton's plan

could not succeed." This was Mr. John Stevens, brother-in-law of Chancellor Livingston, who afterward built the *Phenix,* a steamboat for the Delaware River.

At a special crisis when $1000 was imperatively needed Fulton spent an evening in a vain attempt to convince an intimate friend of the practicability of his invention. The next morning he repeated his persuasions and the friend agreed to advance one hundred dollars with the proviso that Fulton should induce others of his friends to subscribe the remaining nine hundred. After great difficulty the inventor succeeded in obtaining the amount but only on the promise that the names of the subscribers should be kept secret, as they feared that their folly would become a matter of public ridicule.

Fulton's own description of the *Cler-*

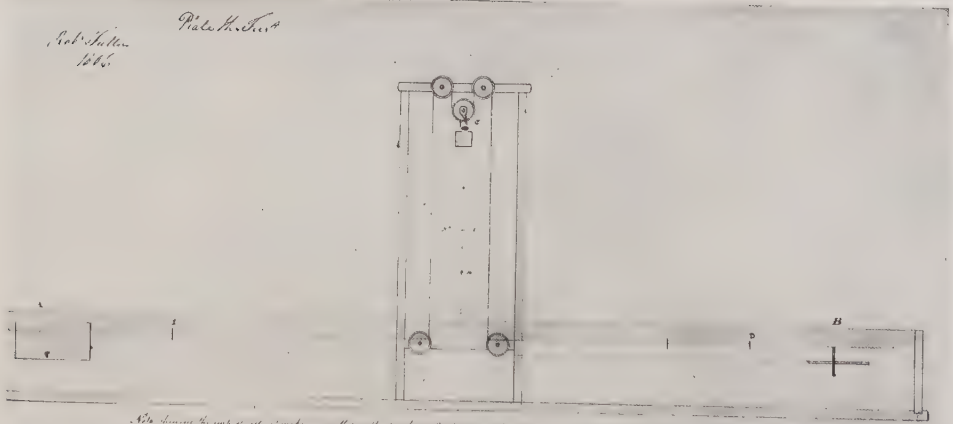
mont is contained in a paper in possession of one of his heirs:

FULTON'S OWN DESCRIPTION OF THE *CLERMONT*

"My first steamboat on the Hudson's River was 150 feet long, 13 feet wide, drawing 2 ft. of water, bow and stern 60 degrees: she displaced 36.40 cubic feet, equal 100 tons of water; her bow presented 26 ft. to the water, plus and minus the resistance of 1 ft. running 4 miles an hour."[1]

[1] In the "Nautical Gazette" the editor, Mr. Samuel Ward Stanton, gives the following additional details:

"The bottom of the boat was formed of yellow pine plank 1.5 in. thick, tongued and grooved, and set together with white lead. This bottom or platform was laid in a transverse platform and molded out with batten and nails. The shape of the bottom being thus formed, the floors of oak and spruce were placed across the bottom; the spruce floors being 4×8 inches and 2 feet apart. The oak floors were reserved for the ends, and were both sided and molded 8 inches. Her top timbers (which were of spruce and ex-



"PLATE THE FIRST": FULTON'S DESIGN OF ORIGINAL APPARATUS FOR DETERMINING THE RESISTANCE OF PADDLES FOR THE PROPULSION OF THE *CLERMONT*, DATED 1806

From the original in the New Jersey Historical Society. Now first published

Fulton did not take out a patent for his steamboat until February, 1809, and his second patent was secured October 2, 1810.[1]

COMMERCIAL SUCCESS OF THE *CLERMONT*

THE commercial success which the *Clermont* attained led, within a few months, to the necessity of its enlargement and development, and this reconstruction obscured the knowledge of the initial plans for the first American boat, which until recently have been considered lost. A highly important discovery of four folios of Fulton's original drawings, at the New Jersey Historical Society, presented about thirty years ago by the late Solomon

tended from a log that formed the bridge to the deck) were sided 6 inches and molded at heel, and both sided and molded 4 inches at the head. She had no guards when first built and was steered by a tiller. Her draft of water was 28 inches."

[1]See Appendix, pages 338, 339.

Alossen, a Hollander, who had a fondness for collecting historical data, has brought to light two of Fulton's original drawings of 1806, and his plans which shortly followed, which are here reproduced for the first time by permission of the New Jersey Historical Society.

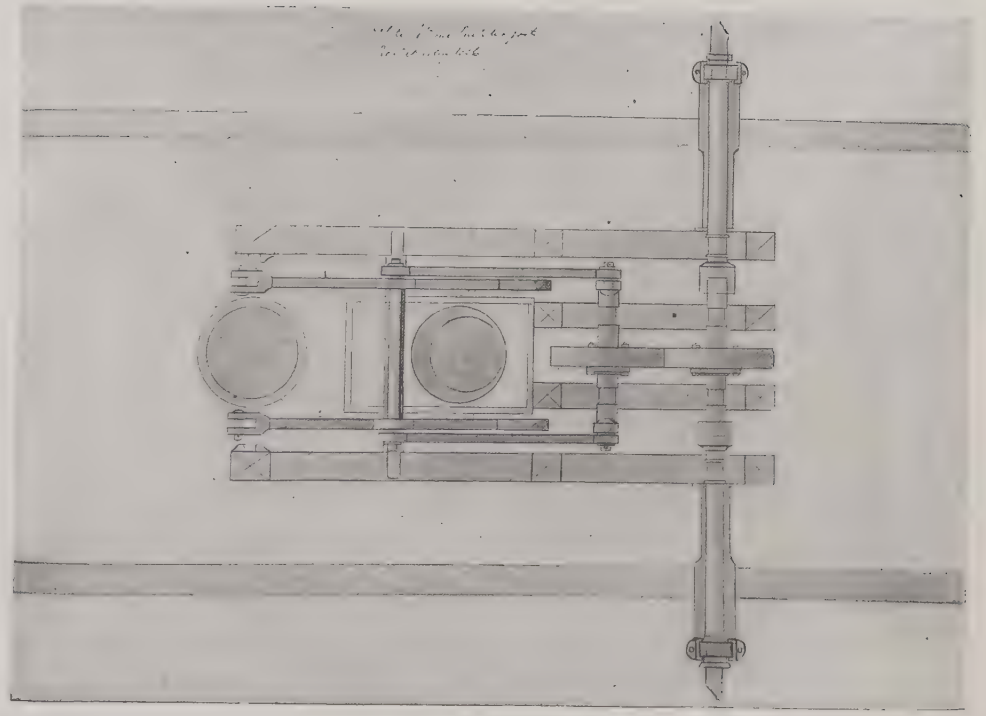
The six plans here published have been submitted to Mr. Frank E. Kirby, the well-known naval architect, who drew the plans for the Hudson-Fulton Commission's facsimile of the *Clermont,* and also designed the *Hendrick Hudson,* and many other large vessels. Mr. Kirby has identified these plans and given them the titles used herewith. He says: "The discovery of these plans of Robert Fulton's is the most important addition to the authentic history of early steam navigation."

Upon Sunday, the 9th of August,

1807, Fulton primarily tested the capabilities of his new boat upon the East River,—a fact not generally known. He wrote an account of this experimental trip in a letter to the Chancellor; the following important extracts are quoted from "The Livingstons of Callendar," privately printed by Clermont and E. Brockholst Livingston:

"Yesterday about 12 o'clock I put the steamboat in motion first with a paddle 8 inches broad 3 feet long, with which I ran about one mile up the East River against a tide of about one mile an hour, it being nearly high water. I then anchored and put on another paddle 8 inches wide 3 feet long, started again and then, according to my best observations, I went 3 miles an hour, that is two against a tide of one: another board of 8 inches was wanting, which had not been prepared, I therefore

turned the boat and ran down with the tide—and turned her round neatly into the berth from which I parted. She answers the helm equal to any thing that ever was built, and I turned her twice in three times her own length. Much has been proved by this experiment. First that she will, when in complete order, run up to my full calculations. Second, that my axles, I believe, will be sufficiently strong to run the engine to her full power. Third, that she steers well, and can be turned with ease." And he jubilantly continues, after giving some further particulars concerning the working of the engine, and some contemplated alterations to the paddles, "yesterday I beat all the sloops that were endeavoring to stem tide with the slight breeze which they had; had I hoisted my sails I consequently should have had all their means added to my own. Whatever may be the



"PLATE 4." FULTON'S PRELIMINARY STUDY FOR THE *CLERMONT'S* ENGINE

From the original in the New Jersey Historical Society. Now first published

fate of steamboats for the Hudson, everything is completely proved for the Mississippi, and the object is immense." In this letter he also mentions that he expects his contemplated "corrections, with the finishing of the cabins, will take me the whole week, and I shall start on Monday next at 4 miles an hour."[1]

There is an interesting chronological coincidence in the hitherto unnoted fact that Fulton had first tested his trial boat upon the Seine on the ninth day of August, 1803, exactly four years previous to his preliminary test of the *Clermont* upon the East River on the ninth day of August, 1807. It is to be wondered whether Fulton consciously kept this anniversary, or did history, with its strange accuracy, again repeat itself?

[1] The above letter, Robert Fulton to Robert R. Livingston, is dated New York, Monday the 10th of August, 1807. Original letter in the possession of Clermont Livingston, Esq. This letter bears the New York postmark of same date.

HISTORIC FIRST VOYAGE OF THE *CLERMONT*

On August 17, 1807, the *Clermont* made its memorable first voyage up the Hudson. At one o'clock the boat was loosed from its moorings at a dock on the North River near the State's Prison, Greenwich Village.

Fulton's feelings at this crisis are set down in a letter to an unknown friend, quoted as part of a reminiscence by the late Judge Story in Sanders' early "History of Schenectady," and secured by Mrs. Robert Fulton Blight from alleged original.

My dear sir:

The moment arrived in which the word was to be given for the boat to move. My friends were in groups on the deck. There was anxiety mixed with fear among them. They were silent, sad and weary. I read in their looks

nothing but disaster, and almost repented of my efforts. The signal was given and the boat moved on a short distance and then stopped and became immovable. To the silence of the preceding moment, now succeeded murmurs of discontent, and agitations, and whispers and shrugs. I could hear distinctly repeated—"I told you it was so; it is a foolish scheme: I wish we were well out of it."

I elevated myself upon a platform and addressed the assembly. I stated that I knew not what was the matter, but if they would be quiet and indulge me for half an hour, I would either go on or abandon the voyage for that time. This short respite was conceded without objection. I went below and examined the machinery, and discovered that the cause was a slight maladjustment of some of the work. In a short time it was obviated. The boat was again put in motion. She continued to move on. All were still incredulous. None seemed willing to trust the evidence of their own senses. We left the fair city of New York; we passed through the romantic and ever-varying scenery of the Highlands; we descried the clustering houses of Albany; we reached its shores,—and

then, even then, when all seemed achieved, I was the victim of disappointment.

Imagination superseded the influence of fact. It was then doubted if it could be done again, or if done, it was doubted if it could be made of any great value.

Yours,

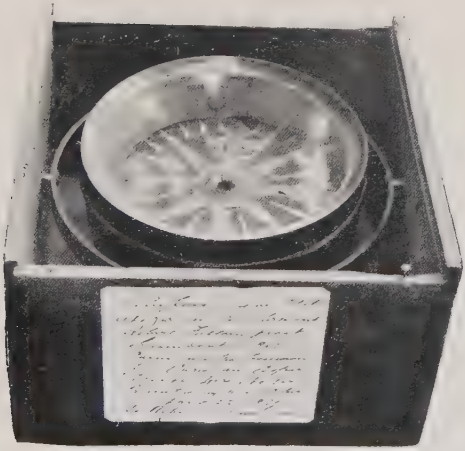
R. Fulton.

The *Clermont* was an odd craft. The machinery, placed in the center, was exposed to view and creaked ominously. Only the bow and stern were covered to form the cabins. The unprotected paddle-wheels swung ponderously at each side and splashed the water as they revolved. There were two masts, but no bowsprit, as sometimes pictured. The compass was rather rude but answered the purpose well, though the man at the tiller in the stern had difficulty in defining the course.

After the first voyage Fulton recognized the misplacement of the tiller and

FULTON'S INKSTAND

In possession of Alice Crary Sutcliffe



COMPASS USED BY PILOT ACKER ON THE *CLERMONT*

In possession of Mr. Robert Fulton Ludlow

proposed an adjustment of guiding ropes from each side of the tiller to a forward wheel near the mainmast, and this alteration was made before the vessel passed into commercial service. There was no steam whistle, and upon the arrival of the boat at a wharf a horn was blown, and some of the crew set to work to carry enough wood on board to supply fuel to last until the next landing.

Like the vessel itself the impression it made was unique. It was described as an "ungainly craft looking precisely like a backwoods saw-mill mounted on a scow and set on fire." It is easy to fancy the astonishment and alarm of the crews of the ordinary sailing boats of the river and of the dwellers in the towns along the shores. Some of the sailors, it is asserted, when they saw "this queer-looking sailless thing" gaining upon them in spite of

contrary wind and tide, actually abandoned their vessels and took to the woods in fright.

Others who saw the boat in the night described her as a "monster moving on the waters defying the winds and tide, and breathing flames and smoke." Some prostrated themselves and prayed a kind Providence for protection from the approaches of the monster, which was marching on the waters and lighting its pathway with fire.

It is easy in this day of full understanding to find amusement in their overwhelming consternation, but the appearance of the boat must indeed have been terrific. The fuel used was pine wood, and when the fire was stirred by the engineer a galaxy of sparks ascended. No wonder that the quiet dwellers in the valley were frightened by the novel sight.

Miss Helen Livingston, daughter of Gilbert R. Livingston, who with her sister Kate had been visiting "Liberty Hall" at Elizabethtown, New Jersey, the home of their cousin William Livingston, Governor of the State, had written at the conclusion of her visit:

"My dear mother will be glad to know that we are soon to return home. Cousin Chancellor has a wonderful new boat which is to make the voyage up the Hudson some day soon. It will hold a good many passengers and he has, with his usual kindness, invited us to be of the party. He says it will be something to remember all our lives. He says we need not trouble ourselves about provisions, as his men will see to all that. In the mean time we are enjoying ourselves very much; everybody is so kind and cordial."

Her recollections of the voyage were

personally narrated to her granddaughter, Helen Evertson Smith, who included them in an interesting article published in "The Century" for December, 1896. The guests of the occasion, who numbered about forty, included but few ladies. Among these were the two young sisters, Helen and Kate Livingston; their aunt, Mrs. Thomas Morris, daughter-in-law of Robert Morris, the financier of the Revolution; one of the Chancellor's two daughters; four of the many daughters of his brothers John R. and Colonel Harry Livingston; and Miss Harriet Livingston, daughter of Mr. Walter Livingston, first custodian of the United States Treasury.

Other passengers, besides Livingston and Fulton, were John R. Livingston and John Swift Livingston, and Doctor Mitchell and Doctor McNeven, to whom Cadwallader Colden, who wrote a Life of

Fulton, acknowledges his description of the voyage; the Dean of Ripon Cathedral, England, who was *en route* to visit the Chancellor, and Mr. Barker with his little daughter.

Helen Livingston, whose girlish letter of invitation has been quoted and who later married William Mather Smith, confided to her granddaughter an intensely interesting fact which occurred on the second day of the progress up the river. Just before the boat was about to cast anchor off Clermont, the Chancellor announced the betrothal of Robert Fulton to his young kinswoman, Harriet Livingston, and made the prophecy that the "name of the inventor would descend to posterity as a benefactor to the world," and that it was not impossible that before the close of the present century, vessels might even be able to make the voyage to Europe without

other motive power than steam. This hardy prediction was received with but moderate approval by any; while smiles of incredulity were exchanged between those who were so placed that they could not be seen by the speechmaker or the inventor. John R. Livingston was heard to say, in an aside to his cousin John Swift Livingston, that "Bob has had many a bee in his bonnet before now, but this steam folly will prove the worst yet!"

An early newspaper clipping is authority for the statement that Fulton had previously asked the Chancellor, "Is it presumptuous in me to aspire to the hand of Miss Harriet Livingston?" "By no means," the distinguished Chancellor is said to have replied, "her father may object because you are a humble and poor inventor, and the family may object —but if Harriet does not object,—and she seems to have a world of good sense,—go

ahead, and my best wishes and blessings go with you."

Certainly that day was one of crowning glory in Fulton's life. He was now forty-two years old, and a prominent man upon both sides of the Atlantic, vouched for by Chancellor Livingston, who recognized the fine manhood and superior talents of the inventor, and who had in France known his prestige and popularity with Barlow and other men of distinction. It was natural that Harriet Livingston should return Fulton's regard by an estimate of his genius amounting to enthusiasm. A contemporaneous writer described him thus:

"Among a thousand individuals you might readily point out Robert Fulton. He was conspicuous for his gentle, manly bearing and freedom from embarrassment, for his extreme activity, his height, somewhat over six feet,—his slender yet ener-

getic form and well accommodated dress, for his full and curly dark brown hair, carelessly scattered over his forehead and falling around his neck. His complexion was fair, his forehead high, his eyes dark and penetrating and revolving in a capacious orbit of cavernous depths; his brow was thick and evinced strength and determination; his nose was long and prominent, his mouth and lips were beautifully proportioned, giving the impress of eloquent utterance. Trifles were not calculated to impede him or damp his perseverance."

Helen Livingston's estimate was no less complimentary:

"There were many distinguished and fine-looking men on board the *Clermont,* but my grand-mother always described Robert Fulton as surpassing them all. 'That son of a Pennsylvania farmer,' she was wont to say, 'was really a prince

MRS. WALTER LIVINGSTON (CORNELIA SCHUYLER), MOTHER OF MRS. ROBERT FULTON

Original owned by Mrs. Hermann H. Cammann, granddaughter of Robert Fulton. This portrait, painted by Robert Fulton on a panel, bears on the reverse his unfinished portrait of his only son, Barlow Fulton. Now first published.

among men. He was as modest as he was great, and as handsome as he was modest. His eyes were glorious with love and genius.' "[1]

Fulton himself, the central figure of congratulation, was happy beyond utterance.

[1] In 1857, Paul A. Sabbaton, Fulton's later Chief Engineer, wrote to J. F. Reigart, biographer of Fulton:

"I was so constantly with Mr. Fulton, saw him at his occupation, at his family fire-side, and in almost every situation, that I have to this day a most distinct and strongly impressed likeness on my mind.—He had all the traits of a man with the gentleness of a child. I never heard him use ill words to any one of those employed under him no matter how strong the provocation might be,—and I do know there was enough of that at times; and ever and anon my mind recurs to the times when his labours were so severe. His habit was, cane in hand, to walk up and down for hours. I see him now in my mind's eye, with his white, loosely-tied cravat, his waistcoat unbuttoned, his ruffles waving from side to side as his movements caused their movements; he, all the while in deep thought, scarcely noticing anything passing him."

The late J. B. Calhoun of Brooklyn, who was in Fulton's employ at the time of the latter's death in 1815, described Fulton as a tall, somewhat slender man, of fair, delicate complexion, of graceful, dignified bearing, and mild and gentle in his temper. He said: "His workmen were always pleased to see him about his shops. With his rattan cane in hand, he always appeared to me a counterpart of an English nobleman."

It was the supreme moment of his life. His bride-elect, Harriet Livingston, a beauty of the day, daughter of Walter Livingston and his wife, Cornelia Schuyler, was an accomplished harpist and sketched and painted with more than ordinary skill. Her father, by the will of his father, the last Lord of the Manor, had received as his portion of the famous estate, about 28,000 acres of ground, lying east of the Post Road. Upon a commanding elevation, between the "Klein" and "Roeloff Jansen" Kills, Walter Livingston had built a massive and imposing mansion which he called "Teviotdale." This became the country-home of Fulton and his wife and frequent mention is made of it in family letters.

It is impossible to overestimate the intensity of the suspense and interest of Fulton and his friends as the *Clermont*

proceeded upon her voyage. The apprehension of the incredulous was turned to joyous approval and wondering satisfaction. When the guests realized the safety and success of the invention, they were moved to merriment and broke into song. In the stern sat a throng of gaily dressed gentlemen and ladies, and as the boat moved through the glorious scenery of the Highlands some one struck up "Ye Banks and Braes o' Bonny Doon," said to have been Fulton's favorite song, appropriate enough from the lips of the members of the Scottish Fulton and Livingston families upon America's most bonny river.

Ye banks and braes o' bonny Doon
How can ye bloom sae fresh and fair;
How can ye chant, ye little birds,
And I sae weary fu' of care?[1]

[1] On the one-hundredth anniversary of steam navigation, the same song was sung upon the decks of the great

The invitations for the first voyage had been so quietly issued by Fulton and the Chancellor that the newspapers of the city, with but one exception, failed to refer to it. The "American Citizen" contained this brief notice:

Mr. Fulton's Ingenious Steam Boat, invented with a view to the navigation of the Mississippi from New Orleans upward, sails today from the North River, near State's Prison, to Albany. The velocity of the Steamboat is calculated at four miles an hour. It is said it will make a progress of two against the current of the Mississippi, and if so it will certainly be a very valuable acquisition to the commerce of Western States.

The general impression of utility for the new invention was that the boat would prove an important factor upon the Mis-

boats of the Hudson River Day Line, where several of Fulton's descendants, including the writer, were guests of honor.

sissippi[1] and other western rivers, rather than upon the waters of the East. This is easily explained by the fact that the recent acquisition of Louisiana had turned public attention toward the necessity of exploiting and speedily improving the new territory. Probably most of the citizens of New York thought themselves fortunately supplied by the hosts of Hudson River sloops for any needs of commerce or travel which might arise. But that Livingston and Fulton, the proprietors of the new enterprise, realized a wider purpose for their new invention is shown by Fulton's letter to Barlow announcing his suc-

[1] Extract from a letter of Fulton to Barlow, April 19, 1812:

"The Mississippi, as I before wrote you, is conquered; the steam boat which I have sent to trade between New Orleans and Natchez carried 1500 barrels = 150 tons from New Orleans to Natchez, against the current 313 miles in 7 days, working in that time 84 hours. These are conquests perhaps as valuable as those at Jena." [Napoleon's then recent victory.]

cessful voyage (quoted later) and by his prompt formation of schemes of navigation upon far distant waters.

Fulton himself, sensible of the recognition of the one newspaper which had chronicled his departure, wrote a letter to the "American Citizen," which practically contains "a sailor's log" of the first trip of the *Clermont*.

New York, August 20.

To the Editor of The American Citizen,
Sir:

I arrived this afternoon at 4 o'clock, [on] the steam boat from Albany. As the success of my experiment gives me great hope that such boats may be rendered of much importance to my country, to prevent erroneous opinions, and to give some satisfaction to the friends of useful improvements, you will have the goodness to publish the following statement of facts:

I left New York on Monday at 1 o'clock, and

arrived at Clermont, the seat of Chancellor Livingston, at 1 o'clock on Tuesday, time 24 hours, distance 110 miles: On Wednesday I departed from the Chancellor's at 9 in the morning, and arrived at Albany at 5 in the afternoon, distance 40 miles, time 8 hours; the sum of this is 150 miles in 32 hours, equal near 5 miles an hour.

On Thursday at 9 o'clock in the morning I left Albany and arrived at the Chancellor's at 6 in the evening; I started from thence at 7, and arrived at New York on Friday at 4 in the afternoon; time 30 hours, space run through 150 miles, equal 5 miles an hour. Throughout the whole way my going and returning the wind was ahead; no advantage could be drawn from my sails—the whole has therefore been performed by the power of the steam engine.

I am, Sir,

Your most obedient,

Robert Fulton.

The *Clermont* continued all night upon the journey, for it will be noted that there

was no deduction in time allowed in Fulton's calculation of the voyage between New York and Albany, except the one anchorage at Clermont where Chancellor Livingston and his guests, including Robert Fulton, went on shore for the second night. The night of August 17th was spent by the company within such shelter as the boat could afford. Flickering candles gave scant illumination in the cabin. Probably there were improvised couches for the ladies of the party, but we know from Fulton's family note-book that the bedding for the boat was not purchased until the month of September, when it appears that he paid for it $80.75 to a Mr. Lym, and about the same time bought "knives and forks" for $5 from James Wood.

The first captain of the *Clermont,* Andrew Brink by name, on the night of August 18th, after he had successfully

landed the Chancellor's party upon the east bank, rowed across the river to his home, and brought back his wife that he might fulfil his promise to "take her to Albany on a boat driven by a tea-kettle."

It is said that Fulton and Livingston first met Captain Brink during a voyage up the Hudson upon the North River sloop *Maria,* of which he was then in command. In the little cabin of this boat they discussed their plans for the *Clermont* and at the time promised to install this interested captain in their own new boat when the long-planned invention should be accomplished.

The exact number of men employed on the *Clermont* is not actually known. In Fulton's account-book, under date of September 20, 1807, we find a partial pay-roll:

To Captain Brink	30	Dollars
George, the Steward	10	"
Paid Griffin, the Black Steward .	12	"
Paid Richard Wilson, the Black Cook	10	"

These sums undoubtedly represented the wages for the month which had elapsed since the first trip. There was also a white stewardess at this time, or at a later date, for a woman who lived at Highland Falls, New York, once sent an engraving of Robert Fulton to his grandson, Rev. Dr. Crary, with the message that her mother, who was stewardess on the *Clermont,* had cherished the picture of her employer for many years.

The chief engineer on the first voyage was a Scotchman whose name is unknown. On the arrival of the boat in Albany it is said that he celebrated the event by a rousing "spree," so paralyzing his activities

that Mr. Fulton was obliged to discharge him and to promote a Mr. Dyke, assistant engineer, to the chief position. This Mr. Dyke, Charles by name, continued in Fulton's employ for many years, and when the Fulton Ferry to Brooklyn was established, Dyke was appointed by Fulton engineer of the first boat.

FROM NATIONAL PORTRAIT GALLERY, VOL. III.

"I vividly remember the starting of [the second ferry boat] and a painful incident therewith connected.—The boat had made one or two trips—and was lying at the wharf at the foot of Beekman slip. Some derangement had taken place in the machinery, which the chief engineer was engaged in rectifying. When the machinery was set in motion it came in contact with the engineer, and mangled him in a manner that produced his death the next day. He was removed to the house adjacent to that of the writer, and well does he recall the conversation between Mr. Fulton and the attending surgeon in reference to the unfortunate man.—Mr. Fulton, much affected, remarked—

"'Sir, I will give all I am worth to save the life of that man.'

"When told that his recovery was hopeless, he was perfectly unmanned and wept like a child. It is here introduced as showing that while his own misfortunes never for a single moment disturbed his equanimity, the finer feelings of his nature were sensitively alive to the distresses of others."

(*Signed*) N. B. B.

An interesting contemporaneous account was written by a Frenchman of note —M. Michaux, a distinguished botanist— who accompanied Fulton and Livingston upon the return trip from Albany. He arrived at Burlington on Lake Champlain, with his companion M. Parmentier, and thence went to Albany. M. Michaux writes:[1]

The relations, commercial and other, of all bonds between these cities are many and frequent. At this time decked sailing vessels arrived and departed every day with twenty-five or thirty passengers. The passage generally took 36 or 48 hours, according as the wind or tide were more or less favorable.

We had been three days at Albany when the arrival from New York of a vessel propelled by steam was announced. This boat, which was decked, was about 25 metres (82 feet)[2] long

[1] Translated for the Journal of the Franklin Institute, Philadelphia.

[2] An evident error; the length of the vessel was 150 feet.

ROBERT FULTON

From the painting by Benjamin West. Owned by R. F. Ludlow, Claverack, New York

and was commanded by the inventor, Mr. Robert Fulton. Many of the inhabitants of the city and strangers who were there at the time went to visit it. Every one made his remarks upon the advantages consequent upon the new means of navigation, but also upon the serious accidents which might result from the explosion of the boiler. The vessel was lying alongside the wharf: a placard announced its return to New York for the next day but one, the 20th of August, and that it would take passengers at the same price as the sailing vessels—three dollars.

So great was the fear of the explosion of the boiler that no one, except my companion and myself, dared to take passage in it for New York. We quitted Albany on the 20th of August in the presence of a great number of spectators. Chancellor Livingston, whom we supposed to be one of the promoters of this new way of navigating rivers, was the only stranger with us: he quitted the boat in the afternoon to go to his country residence which was upon the left bank of the river. From every point on the river whence the boat, announced by the smoke of its chimney, could be seen, we saw the in-

habitants collect; they waved their handkerchiefs and hurrahed for Fulton, whose passage they had probably noticed as he ascended the river.

We arrived the next day between one and two o'clock at New York. We separated from Mr. Fulton after paying him the price of our passage. The day after our departure from Albany, and a few minutes after Chancellor Livingston had quitted us, Mr. Fulton expressed his surprise that notwithstanding the number of persons who were going to New York, only two Frenchmen had the courage to embark with him. In the course of the conversation I informed him that M. Chaptal, then Minister of the Interior, had instructed me to examine the forests of America. . . . It appears that, at this time, Mr. Fulton did not suspect that steam navigation might one day be applied to the sea.

The following record of the passengers and their respective payments for conveyance from Albany to New York was copied from the original "Captain's book,"

formerly in possession of Mr. Clermont Livingston. It is quoted in "The Livingstons of Callendar."

List of passengers on board the North River Steamboat from Albany to New York, August 21, 1807:

	Dollars
Captain Thomas Hunt	7
Monsieur Parmentoo }	13
Monsieur Mishaud }	
Mr. D. E. Tyle	6
Captain Davies	1
	27

Mr. Fulton

Joel Barlow, then resident at Kalorama, his country-seat near Washington, received about this time the following interesting letter[1] from Fulton which elaborates the main points of his account forwarded to "The American Citizen." Fulton's

[1] "Life and Letters of Joel Barlow," by C. B. Todd.

enthusiasm in the success of his project is strongly manifested and it will be noted that he was already confident that great future advantages to America would result from the new invention:

My steamboat voyage to Albany and back has turned out rather more favorably than I had calculated. The distance from New York to Albany is one hundred and fifty miles. I ran it up in thirty-two hours, and down in thirty. I had a light breeze against me the whole way, both going and coming, and the voyage has been performed wholly by the power of the steam engine. I overtook many sloops and schooners, beating to the windward, and parted with them as if they had been at anchor. The power of propelling boats by steam is now fully proved. The morning I left New York, there were not perhaps thirty persons in the city who believed that the boat would ever move one mile an hour, or be of the least utility, and while we were putting off from the wharf, which was crowded with spectators, I heard a number of sarcastic remarks. This is the way in which ignorant men

compliment what they call philosophers and projectors. Having employed much time, money and zeal in accomplishing this work, it gives me, as it will you, great pleasure to see it fully answer my expectations. It will give a cheap and quick conveyance to the merchandise on the Mississippi, Missouri, and other great rivers, which are now laying open their treasures to the enterprise of our countrymen; and although the prospect of personal emolument has been some inducement to me, yet I feel infinitely more pleasure in reflecting on the immense advantage that my country will derive from the invention.

Barlow in a letter[1] to Chancellor Livingston, written the 18th of September, 1807, says:

I sincerely rejoice with you at the success of our mutual and good friend Fulton with the Steam Boat, and hope and trust it will answer your highest expectations. Next year we intend to make an excursion to the North, we hope with Fulton, when we will try the new

[1] In the library of Haverford College.

Balloon up the river, and make you the visit on which our hearts are much fixt.

After her return from the first voyage up the Hudson, the *Clermont* was left at the New York dock for more than two weeks. This time was considered necessary by Fulton and Livingston to fit the boat for regular traffic and to make certain improvements which Fulton notes in the following letter to the Chancellor, who had remained at his country place.

New York,
Saturday, the 28 [29th] of August, 1807

Dear Sir:

On Saturday I wrote you that I arrived here on Friday at four o'clock, which made my voyage from Albany exactly thirty hours. We had a little wind on Friday morning, but no waves which produced any effect. I have been making every exertion to get off on Monday morning, but there has been much work to do—

boarding all the sides, decking over the boiler and works, finishing each cabin with twelve berths to make them comfortable, and strengthening many parts of the iron work. So much to do, and the rain, which delays the caulkers, will, I fear, not let me off till Wednesday morning. Then, however, the boat will be as complete as she can be made—all strong and in good order and the men well organized, and I hope, nothing to do but to run her for six weeks or two months. The first week, that is if she starts on Wednesday, she will make one trip to Albany and back. Every succeeding week she will run three trips—that is, two to Albany and one to New York, or two to New York and one to Albany, always having Sunday and four nights for rest to the crew. By carrying for the usual price there can be no doubt but the steamboat will have the preference because of the certainty and agreeable movements. I have seen the captain of the fine sloop from Hudson. He says the average of his passages have been forty-eight hours. For the steamboat it would have been thirty certain. The persons who came down with me were so much pleased that they said were she established to

run periodically they would never go in any thing else. I will have her registered and every thing done which I can recollect. Every thing looks well and I have no doubt will be very productive.

Yours truly,

ROBERT FULTON.

The following postscript ends the letter of August 29th:[1]

You may look for me Thursday morning about seven o'clock. I think it would be well to write to your brother Edward to get information on the velocity of the Mississippi, the size and form of the boats used, the number of hands and quantity of tons in each boat, the number of miles they make against the current in twelve hours, and the quantity of tons which go up the river in a year. On this point beg of him to be accurate.

[1] Robert Fulton to Robert R. Livingston, Saturday, 28 [29th] August, 1807. Original formerly in possession of Mr. Clermont Livingston.

On the 2d of September, the necessary equipment and alterations having been completed, Fulton inserted his first advertisement in "The Albany Gazette," and the "Evening Post" of New York. It read:

THE NORTH RIVER STEAM BOAT

Will leave Pauler's Hook Ferry on Friday the 4th of September, at 6 in the morning, and arrive at Albany, on Saturday, at 6 in the afternoon.

Provisions, good berths and accommodations are provided.

The charge to each passenger is as follows:

To Newburgh	$3	time 14 hours
To Poughkeepsie	4	17
To Esopus	4½	20
To Hudson	5	30
To Albany	7	36

For places, apply to Wm. Vandervoort, N°. 48 Courtlandt-street, on the corner of Greenwich-street.

Way passengers to Tarry Town, etc., etc., will apply to the captain on board.

The Steam Boat will leave Albany on Monday the 7th of September at 6 in the morning and arrive at New-York on Tuesday at 6 in the evening.

She will leave New-York on Wednesday morning at 6, and arrive at Albany on Thursday evening at 6 in the evening.

She will leave Albany on Friday morning at 6, and arrive at New-York on Saturday evening at 6.—Thus performing two voyages from Albany and one from New-York within the week. On Monday the 14th, and Friday the 18th, she will leave New-York at 6 in the morning, and Albany on the 16th, at 6

in the morning, after which the arrangements for her departure will be announced.

On the same day Fulton paid $4.50 for the advertisement and also bought some furnishings, previously noted, for the *Clermont.*

For three weeks this advertisement continued to appear, but on September 23d a new announcement was issued:

THE STEAM BOAT being thoroughly repaired, and precaution taken that injury shall not be done to her wheels in future, it is intended to run her as a PACKET for the remainder of the season. She will take her departure from New-York and Albany at 9 o'clock in the morning, and always perform her voyage in from 30 to 36 hours.

The time of her departure for the first nine voyages will be as follows:
From Albany, Friday the 25th September.
From New-York, Monday 28th do.
From Albany, Wednesday 30th do.
From New-York, Friday 2d October.
From Albany, Monday 5th "
From New-York Wednesday 7th do.
From Albany, Friday 9th do.

For passage, apply to Mr. WILLIAM VANDERVOORT, No. 48 Courtlandt-Street, corner of Greenwich-street.

Several minor mishaps occurred during the first months of the new manner of voyaging. Maladjustments were to be expected, but it also appears that the sloops of the Hudson, either purposely or by the strange attraction which one moving body feels for another, especially in the moment of a helmsman's fear, had

STATUE OF ROBERT FULTON AT THE FULTON FERRY-HOUSE, BROOKLYN, NEW YORK

Modeled after the Jarvis portrait, now in possession of the Misses Vinton

several serious collisions with the *Clermont.*

It is recorded that chief among the troubles encountered were the erratic movements of the river sloops which ran afoul of the steamboat whenever opportunity offered. On October 2d the *Clermont* lost one paddle-wheel from such a collision, and had to be withdrawn from service. This damage was speedily repaired and she was soon able to resume the regular trips. Each day the passengers became more numerous. Twenty-four made the trip on September 4th, but by October 1st the number had increased to sixty, and by November her cabins were overcrowded with more than a hundred.

The "Evening Post" of October 2, 1807, contained this item of news:

Steam Boat. Mr. Fulton's new invented Steam Boat which is fitted up in a neat stile

for passengers, and is intended to run from New York to Albany as a Packet, left here this morning with Ninety passengers, against a strong head wind. Notwithstanding which, it was judged she moved through the water at the rate of six miles an hour. Yesterday she came in from Albany in 28 hours with 60 passengers. Quere, [*sic*] would it not be well if she could contract with the Post Master General to carry the mail from this city to Albany?

The popularity and success of Fulton's venture were now assured. Enthusiastic passengers began to write letters to the press, and from that time on records are less meager. One of the earliest descriptions is that of Judge John Q. Wilson, of Albany, who in 1856, at the request of friends, wrote an account of his memorable voyage upon the *Clermont,* when she was first put into use as a packet.

It may be of some interest to the present generation to have a correct account of the

first boat built by Fulton and Livingston, on her first trip as a passage vessel, by one who was then a passenger. The writer of this article resided in New York, and was often in the shipyard when Mr. Fulton was building his first boat. She was a queer looking craft; and, like every thing new, excited much attention, and not a little ridicule. When she was launched, and the steam engine placed in her that also was looked upon as a piece [of folly] with the boat built to float it. In those days the operations of the steam engine were but little known. A few had seen the one for raising the Manhattan water, but to the people at large the thing was a hidden mystery. Curiosity was now greatly excited. When it was announced in New York that the boat would start from the foot of Courtlandt street at 6½ o'clock on Friday morning, the 4th of September, and take passengers to Albany, there was a broad smile on every face as the inquiry was made if anybody would be foolhardy enough to go. A friend of the writer of this article, hearing he intended to venture, accosted him in the street: "John, will thee risk thy life in such a concern? I tell thee she is

the most fearful wild fowl living, and thy father ought to restrain thee."

When Friday morning came the wharves, piers, housetops, and every spot from which a sight could be obtained, were filled with spectators. There were twelve berths, and every one was taken. The fare was $7. All the machinery of the boat was fully exposed to view; the water and balance wheels were entirely uncovered.[1] The peripheries were of cast-iron, some four inches or more square, and ran just clear of the water. The weight of both the water and balance-wheels was sustained by the shafts, which projected over the sides of the vessel. There were no outside guards. The forward part of the boat was covered by a deck, which afforded shelter for the men employed in navigating the boat. The after part was fitted up in a rough manner for passengers; the entrance into the cabin was from the stern, in front of the steersman, who worked a tiller, the same as in an ordinary sloop. Thick, black smoke issued from the chimney—steam hissed from every ill-fated valve and crevice of the engine.

[1] The covering was placed upon the remodeled boat and was not upon the *Clermont*.

Fulton himself was there, his remarkably clear and sharp voice was heard above the hum of the multitude and noise of the engine. All his actions were confident and decided, unheeding the fearfulness of some and the doubts and sarcasms of others. In the whole scene combined there was an individuality and an interest which, like "love's young dream," comes but once, and is remembered forever. The time for the departure of the boat arrived; some of the machinery still required to be adjusted; there was a delay. Some of the passengers said, in Fulton's hearing, they feared the voyage would prove a failure. He replied:

"Gentlemen, you need not be uneasy; you shall be in Albany before twelve o'clock tomorrow."

When everything was ready, the engine was started, and the boat moved steadily but slowly from the wharf. As she turned up the river and was fairly under way there arose such a huzza as ten thousand throats never gave before. The passengers returned the cheer, but Fulton stood erect upon the deck, his eye flashing with an unearthly brilliancy as he surveyed the crowd. He felt that the magic wand of suc-

cess was waving over him, and he was silent. It was agreed that a kind of log-book should be kept. Gerrit H. Van Wagenen was designated to give the time, and the writer of this article to set it down. At the termination of the voyage, the following paper was drawn up and signed by all the passengers and published in the Albany "Register" of Tuesday, September 8, 1807:

"On Friday morning, at eighteen minutes before 7 o'clock, the North River steamboat left New York, landed one passenger at Tarrytown (twenty-five miles) and arrived at Newburgh (sixty-three miles) at 4 o'clock in the afternoon; landed one passenger there, and arrived at Clermont (one hundred miles), where two passengers, one of whom was Mr. Fulton, were landed at fifteen minutes before 2 o'clock in the morning, and arrived at Albany at twenty-seven minutes past 11 o'clock, making the whole time twenty-eight hours and forty-five minutes; distance, one hundred and fifty miles. The wind was favorable, but light from Verplanck's Point to Wappinger's Creek (forty miles). The remainder of the way it was ahead, or there was a dead calm. The sub-

scribers, passengers on board of this boat on her first passage as a packet, think it but justice to state that the accommodations and conveniences on board exceeded their most sanguine expectations:

Selah Strong,	G. H. Van Wagenen,
Thomas Wallace,	John Q. Wilson,
John P. Anthony,	Dennis H. Doyle,
George Wetmore,	William S. Hicks,
J. Bowman,	J. Crane,
James Braden,	Stephen N. Rowan.

Albany, September 5, 1807."

When coming up Haverstraw Bay a man in a skiff lay waiting for us. His appearance indicated a miller; the paddle-wheels had very naturally attracted his attention; he asked permission to come on board. Fulton ordered a line to be thrown to him, and he was drawn alongside. He said he "did not know about a mill going upstream, and came to inquire about it." One of the passengers, an Irishman, seeing through the simple-minded miller man at a glance, became his cicerone; showed him all the machinery and contrivances by which one wheel could

be thrown out of gear when the mill was required to come about. After finishing the examination, said he, "that will do; now show me the mill-stones." "Oh," said the other, "that is a secret which the master," pointing to Fulton, "has never told us; but when we come back from Albany with a load of corn, then if you come on board you will see the meal fly." Dennis kept his countenance and the miller left. As we passed West Point the whole garrison was out and cheered us. At Newburgh it seemed as if all Orange County had collected there; the whole side-hill city seemed animated with life. Every sail-boat and water craft was out; the ferry-boat from Fishkill was filled with ladies. Fulton was engaged in seeing a passenger landed, and did not observe the boat until she bore up alongside. The flapping of the sail arrested his attention, and as he turned, the waving of so many handkerchiefs and the smiles of bright and happy faces, struck him with surprise. He raised his hat and exclaimed, "That is the finest sight we have seen yet."

FULTON'S LETTER TO THE CAPTAIN

By October the *Clermont* was fully established as a packet for the public. Captain Brink remained in charge throughout the year 1807 and was succeeded the following spring by Captain Samuel Wiswall, who remained for many years thereafter in Fulton's employ. That Fulton realized the responsibilities of leadership and expected each man whom he placed in authority to prove his fitness for the task, is shown in the following masterly letter now in possession of a grandson of Captain Brink:

New York, Oct. 9, 1807.

Capt Brink:—

Sir—

Inclosed is the number of voyages which it is intended the Boat should run this season.

You may have them published in the Albany papers.

As she is strongly man'd and every one except Jackson under your command, you must insist on each one doing his duty or turn him on shore and put another in his place. Everything must be kept in order, everything in its place, and all parts of the Boat scoured and clean. It is not sufficient to tell men to do a thing, but stand over them and make them do it. One pair of Quick and good eyes is worth six pair of hands in a commander. If the Boat is dirty and out of order the fault shall be yours. Let no man be Idle when there is the least thing to do, and make them move quick.

Run no risques of any kind when you meet or overtake vessels beating or crossing your way. Always run under their stern if there be the least doubt that you cannot clear their head by 50 yards or more. Give in the accounts of Receipts and expenses every week to the Chancellor.

Your most Obedient

Robt. Fulton.

In his Life of Robert Fulton, James Renwick, LL.D., includes the following valuable description of the inventor's charm of personality:

"Fulton was in person considerably above the middle height; his countenance bore marks of intelligence and talent. Natural refinement, and long intercourse with the most polished societies both of Europe and America, had given him grace and elegance of manners. His great success, and the belief that his invention had secured the certainty of great wealth, however unfounded this belief was proved to be after his death, never for a moment rendered him arrogant or assuming. Fond of society, he was the soul of the intelligent circle in which he moved, and of which his hospitable mansion was the center. The fine arts, once his chosen profession, were his recreation

and delight in after life; and he not only practised them himself, but bountifully encouraged the efforts of others."

On the 13th of November, another mishap occurred to the *Clermont,* which necessitated a delay of one day in the fulfilment of her schedule. The "Evening Post" chronicled the slight accident on the following day, November 14th, which, it may be observed, was Fulton's forty-second birthday:

> Steam Boat—Yesterday morning the Steam Boat left Courtlandt-street dock for Albany, with between 40 and 50 passengers. She had not proceeded further than opposite the State Prison, before one of the axeletrees [*sic*] broke off short, and she was obliged to return. We understand she will be repaired in the course of the day, and start again to-morrow morning at 10 o'clock.

Fulton contrived to run the vessel upon scheduled trips, until the ice in the river made navigation impossible. She was

crowded with passengers and the commercial success of the experiment was fully guaranteed. The "Post" stated on the 19th of November:

> We learn by the passengers who arrived last evening from Albany in the Steam Boat, that on Monday last the river from Albany down as far as Coxsackie froze entirely across.

But the passengers themselves felt no inconvenience or impatience from the ice impact, as is evidenced in their letter to the "Post."

New York, November 19, 1807

The subscribers, passengers in the North River Steam Boat, state that the Boat left the dock at Albany, at half past 4 o'clock on Tuesday afternoon, the 17th instant—that they took in some passengers at the Overslaugh—came too [*sic*] at Hudson, and owing to the violence of the wind, was obliged to cast anchor near Stony Point. That they arrived at the Hoboken ferry, on the Jersey shore, last evening, the 18th inst. at half past 10 o'clock. The time then will be as follows:

From Tuesday half past 4 P. M. to
Wednesday half past 2 P. M. . . 30 hours
Deduct time the Boat was at anchor
during the passage, at and near
Stony Point . . . . . 7 hours

23 hours

The subscribers cannot but express their most unequivocal approbation of the treatment they received during the passage, and that no accident of any kind occurred, although during the whole passage the wind was extremely violent, particularly when the Boat came too [*sic*] at Stony Point.

J. V. N. Yates,
James McVarner,
Sidney Berry, Junr.,
W. V. Yates,
T. Stitson,
Peter Morte,
J. Warner, Junr.,
William W. Russell,
J. Nathan Perkins,
Pliny Adams,
Daniel Geer.

The Steam Boat will start from here again next Sunday morning precisely at 10 o'clock.

During the succeeding months, the *Clermont* was kept in winter quarters, and

underwent important alterations and improvements. The following letter from Fulton, who was then in Washington, to Chancellor Livingston in New York fully notes the plans for the enlargement of the boat and gives the specifications for her future financial and structural development.

The important letter is in possession of the New York Historical Society:

To Robert R. Livingston

Washington November the 20th 1807

Dear Sir

I have received your letter of the 12th inst. after all accidents and delays our boat has cleared 5 per cent on the capital expended and as the people are not discouraged but continue to go in her at all risques, and even increase in numbers I think with you that one which should be complete would produce us from 8 to 10,000 dollars a year or perhaps more and that another boat which will cost 15,000 dol-

lars will also produce us 10,000 dollars a year therefore as this is the only method which I know of gaining 50 or 75 per cent I am on my part determined not to dispose of any portion of my interest on the North river but I will sell so much of my funds as will pay my part of rendering this boat complete and for establishing another so that one will depart from Albany and one from New York every other day and carry all the passengers. It is now necessary to consider how to put our first boat in a complete state for 8 or 10 years—and when I reflect that the present one is so weak that she must have additional knees and timbers, new side timbers deck beams and deck, new windows and cabins altered, that she perhaps must be sheathed, her boiler taken out and a new one put in her axels forged and Iron work strengthened with all this work the saving of the present hull is of little consequence particularly as many of her Knees Bolts timbers and planks could enter into the construction of a new boat, my present opinion therefore is that we should build a new hull her knees and floor timbers to be of oak her bottom planks of 2 Inch oak her side planks two Inch oak for 3 feet high She to be 16 feet wide 150 feet long this will make

Obverse Reverse

FULTON MEDAL. STRUCK AFTER THE INVENTOR'S DEATH IN 1815

From the original owned by Mrs. Hermann H. Cammann. Engraved by R. C. Collins

her near twice as Stiff as at present and enable us to carry a much greater quantity of sail, the 4 feet additional width will require 1146 lbs additional purchase at the engine moving 2 feet a second or 15 double strokes a minute this will be gained by raising the steam 5 lb to the Inch as 24 Inches the diameter of the cylinder gives 570 round Inches at 3 lb to the inch = 1710 lb purchase gained to accomplish this with a good boiler and a commodious boat running our present speed, of a voyage in 30 hours I think better and more productive to us than to gain one mile on the present boat.

The new boat Cabins and all complete including our materials will cost perhaps	2000$
Boiler	800
Iron work in the best manner and mens wages during the winter	1200
	4000
To meet this I find that our copper boiler weighs 3930 lb which at 40 cents all the price paid by government will produce	1570$
Profits of this year	1000
	2570

So that we shall have to provide about 1,500$ added to 3,000 Bills against us in the Bank, with this arrangement we shall have one Boat in complete play producing about 10,000 dollars a year to enable us to proceed with the second to come out in the spring of 1809, and then our receipts will be about 20,000 dollars a year.

Please to think of this and if you like it to try to contract with the carpenter at Hudson for the hull and let him immediately prepare his timbers, knees and planks—

She should be almost wall sided if 16 feet at bottom she need not be more than 18 on deck Streight Sides will be strong it fits the mill work and prevents motion in the waves—thus

[drawing omitted]

It is now time to lay her up for the winter. Nothing should be risqued from bad weather—the gain will be triffling the risque great.

I cannot be with you before the first week of January

"Compliments to all friends write me again

Yours truly

R Fulton

Do not risque the engine in the winds and waves of this season.

It should be noted that Fulton realized the revolutionizing possibilities of steam-navigation, and in this connection, at the close of the record of the *Clermont's* success, it may not be inappropriate to tell of an incident which indicates that Fulton also contemplated the possibility of steam-railways. On one occasion, about a year 1810–11, Fulton was journeying to Washington by stage coach with a party of fellow passengers. A long delay in changing horses at one of the wayside taverns, en route, prompted a lady in the party to say to the inventor:

"Oh, Mr. Fulton, you have invented a way to travel quickly over the water—why can you not invent a way to carry us quickly over the land?"

Fulton bowed low, and said, "Madam, it will come."

It seems to have been about this time that he wrote to Chancellor Livingston outlining a project for steam-railways. The Chancellor's reply has been preserved, and is herewith given. He thought the plan impracticable and Fulton, in the evident impossibility of interesting his partner for the steamboat enterprise in this new undertaking, temporarily gave up the plan.

Albany, N. Y. March 1, 1811

Dear Sir:

I did not till yesterday receive yours of the 25th of February, where it has loitered on the road I am at a loss to say. I had before read of your very ingenious proposition as to the railway communication. I fear however, on mature reflection, that they will be liable to serious objections, and ultimately more expen-

sive than a canal. They must be double, so as to prevent the danger of two such bodies meeting.

The walls on which they are placed must be at least four feet below the surface, and three above, and must be clamped with iron, and even then would hardly sustain so heavy a weight as you propose moving at the rate of four miles an hour on wheels. As to wood it would not last a week. They must be covered with iron and that too, very thick and strong.

The means of stopping these heavy carriages without a great shock and of preventing them from running on each other—for they would be many on the road at once, would be very difficult. In case of accidental stops, or necessary stops to take on wood and water, etc. many accidents would happen.

The carriage of condensing water would be very troublesome. Upon the whole, I fear the expense would be much greater than that of canals, without being so convenient.

R. R. Livingston.

To Robert Fulton, Esq.

Mr. Paul A. Sabbaton, in the letter already quoted from (p. 217), relates that Fulton and Colden had agreed to go to Richmond, Virginia, to build a railway to transport coal from Captain Heath's mines, twelve miles distant, but that Fulton's death put an end to the project. He added, "Had it been otherwise, he would have been the first to put railways in use here."

ENLARGEMENT OF THE *CLERMONT*

During the winter of 1807, as we have seen, the *Clermont* was virtually rebuilt and enlarged to accommodate the increased number of patrons. As the *North River* she made regular trips on the Hudson for several years.

An interesting letter from Robert Fulton to Charles Wilson Peale refers in 1808 to the enlarged boat.

"*Clermont, State of New York,*
June the 11, 1808.

"My steam boat is now in complete operation and works much to my satisfaction, making the voyages from or to New York or Albany, 160 miles, on an average in 35 hours. She has three excellent Cabins, or rather rooms, containing 54 births, with kitchen, larder, pantry, Bar, and steward's room. Passengers have been encourageing. Last Saturday she started from New York with 70, which is doing very well for these times when trade has not its usual activity."[1]

PASSENGER REGULATIONS ON THE *NORTH RIVER* (THE REMODELED *CLERMONT*)

THE following time-schedule and list of regulations for passengers is taken from Captain Samuel Wiswall's book, in possession of John Henry Livingston, Esq., of Clermont.

[1] Letter in possession of C. H. Hart, Esq., of Philadelphia.

THE STEAM BOAT.

For the Information of the Public.

THE STEAM BOAT will leave New York for Albany every Saturday afternoon exactly at 5 o'clock — and will pass

West Point	about	3 o'clock on Sunday
Newburgh	"	6 do [morning.
Poughkeepsie	"	10 do
Esopus	"	1 in the afternoon.
Redhook		3 do
Catskill		6 do
Hudson		8 in the evening.

She will leave Albany for New York every Wednesday morning exactly at 8 o'clock, and pass Hudson about 3 in the afternoon.

Esopus	8 in the evening.
Poughkeepsie	12 at night.
Newburgh	4 Thursday morning.
West Point	7 do

As the time at which the Boat may arrive at the different places above-mentioned may vary an hour more or less according to the advantage or disadvantage of wind and tide, those who wish to come on board will see the necessity of being on the spot an hour before the time. Persons wishing to come on board from any other landing than here specified, can calculate the time the Boat will pass, and be ready on their arrival. Inn-keepers or boatmen, who bring passengers on board, or take them ashore, from any part of the river, will be allowed one shilling for each person.

Prices of passage—from New York.

To West Point	$3
Newburgh	3.25
Poughkeepsie	4
Esopus	4.25

Redhook	4.50
Hudson	5.00
Albany	7.00

From Albany.

To Hudson	2
Redhook	3
Esopus	3.50
Poughkeepsie	4
Newburgh and West Point	4.50
New York	7

All other passengers are to pay at the rate of one dollar for every twenty miles, and half a dollar for every meal they think proper to have.

No one can be taken on board, and put on shore, however short the distance, for less than 2 dollars.

Young persons from 2 to 10 years of age to pay half price, or two-thirds, if he or she sit at table with the company.

Children under the age of 2 years to pay one fourth price.

Servants who pay two thirds price are entitled to a birth; they pay half price if no birth.

Every person paying full price is allowed 60 lbs. of baggage; if less than whole price 40 lbs. They are to pay at the rate of three cents a pound for all surplus baggage.

Any person taking a birth, shall have no right to change it without permission of the captain.

A person entering their name in the book for a passage, shall pay half price although they shall decline. Half the price of the passage to be paid at the time of entering, or the birth will be considered free for any other subscriber.

Passengers will breakfast before they come on board; dinner will be served up

exactly at 2 o'clock; tea, with meats, which is also supper, at 8 in the evening; and breakfast at 9 in the morning: no one has a claim on the steward for victuals at any other hour.

REGULATIONS.[1]

FOR THE NORTH RIVER STEAM BOAT.

The rules which are made for order and neatness in the boat, are not to be abused. Judgment shall be according to the letter of the law. Gentlemen wishing well to so public and useful an establishment, will see the propriety of strict justice, and the impropriety of the least imposition on the purse or feelings of any individual.

The Back Cabin, of 12 births, but which will accommodate 18 persons, is exclusively for the Ladies and their children. They who first apply and

[1] Here for the first time published.

enter their names on the book, and at the same time pay their passage-money, shall have the choice of 12 births. Any greater number of persons will be accommodated with sophas or cross lockers.

The Great Cabin of 24 births, which will accommodate 36 persons, is for Gentlemen. The first who apply and enter their names in the book, at the same time paying their passage-money, will have their choice of the 24 births. Any greater number of persons will be accommodated with sophas.

The Fore Cabin, of 16 births, will accommodate 24 persons. The first who apply, on entering their names and paying their passage-money, will have the choice of the births. Any greater number of persons will be accommodated with sophas.

Way-Passengers, who are not out for more than half the night, are not entitled to lie down in a birth.

As the comfort of all persons must be considered, cleanliness, neatness, and order are necessary; it is therefore not permitted that any person shall smoke in the ladies' cabin, or in the great cabin, under a penalty, first of one dollar and a half, and half a dollar for each half hour they offend against this rule; the money to be spent in wine for the company.

It is not permitted for any person to lie down in a birth with their boots or shoes on, under a penalty of one dollar and a half, and half a dollar for every half hour they may offend against this rule.

A shelf has been added to each birth, on which gentlemen will please to put

their boots, shoes, and clothes, that the cabin may not be incumbered.

On deck and in the fore cabin it is allowed to smoke.

In the ladies' cabin and in the great cabin, cards and all games are to cease at 10 o'clock in the evening, that those persons who wish to sleep might not be disturbed.

As the Steam-Boat has been fitted up in an elegant style, order is necessary to keep it so: gentlemen will therefore please to observe cleanliness, and a reasonable attention not to injure the furniture; for this purpose no one must sit on a table under the penalty of half a dollar for each time, and every breakage of tables, chairs, sophas, or windows, tearing of curtains, or injury of any kind, must be paid for before leaving the Boat.

SOME PASSENGERS ON THE EARLY TRIPS

THE captain's passenger list[1] for the *North River* Steamboat showing the individual bookings for the 48th trip of the boat, September 20th, 1809, to May 5th, 1810, inclusive, presents the complete record for eighty-four trips. The names seem an old-time roll-call of the prominent families of the Hudson River. A partial list of the passengers will be of interest:

H. W. Livingston, Lady & Daughter
Mrs. Lawrence
Mr. Monell
Gov. Lewis & Lady & blk. girl
Mr. Tillotson
C. D. Colden & Lady
Mr. Jay
Mr. PV. Rensalaer & Lady
Judge Radcliffe
Mrs. Mynderse & Miss Teller

[1] In possession of John Henry Livingston, Esq., of Clermont.

Miss Cruger
Mr. Schenck
Mr. V. Schoonhoven & Lady
Captain Bogert & Daughter
Mrs. Van Kleeck & Son
Miss Ludlow & Girl
Montgomery Livingston
J. J. Coddington
Miss Duane & Miss Van Kleeck
Mrs. Yates [who carried 461 lbs. of baggage]
Nicholas Roosevelt
Mr. Peter Schuyler
General Gansevoort & Daughter & Lady & Servant
Capt'n Fipher & Lady
J. Alden
Mr. Cuyler, Lady & Ser't
Thos. Ludlow
Walter Livingston
Alden Danforth
Mrs. Pendleton
Mr. Van Tassell
Miss Stats
Mr. Ten Eyck
D. Romeyn Beach
Guy Catlin

Mr. McVicker
Mr. Averill
E. P. Livingston & Family
Mr. Lee Avery
Mr. Buel
Mr. Daniel Potter
Mr. Van Ness
Doct. Bard
Mrs. Schenck & Child
Mrs. Varrick
D. McComb
Mr. Morris
John Stevens
D. Hossack
Mr. Emmet
John Pintard
T. P. Grosvenor
Mr. Ruggles
G. E. Verplanck
Mr. Proudfoot, Lady & Child
Mr. Pawlding &
Mr. Irving
P. V. Hoffman
Doctor Forsyth
Mr. Boyd
Martin Radcliffe

Mr. Burr
Mr. Duer & Family
Mr. Huntington
Alanson Cary
Mr. Bayard
Mr. Beekman & Lady
Mr. Cutting
Mr. Van Wyck
Mr. Pomeroy
Mrs. Livingston &
Mrs. Van Kleeck
N. Bleecker
S. Van Rensalaer & Ser't
Matthew Vassar
Mrs. Content Ferguson
William Hudson
Mr. Kissam & Lady
W. Edgar Jr. &
T. Leroy
J. C. Goldbag
Charles Joy
Mr. Newbould & Lady
Wm. Fish
Mr. Brevort & Ser't
Mr. Beekman
L. Standish

Mr. Satterlee
Mr. Delavan
Mr. Byam
Mr. Sanford
Capt. Chancy
H. R. Teller
Col. Troop
Mr. Pell
C. Guernsey
Isaac Montague

More light on the financial side of the enterprise is furnished by the following page in Fulton's handwriting, now in possession of J. R. Leamont, Esq., of Montreal, here published for the first time. By "the new boat" is probably meant the *Rariton,* Fulton's second American steamboat, which ran from New York to New Brunswick, New Jersey; or *The Car of Neptune* for additional service on the Hudson River, a companion for the *North River.* Both boats were built in 1808.

1808		DISBURSEMENTS BY ROBT FULTON	D	C
June	25	To Mr. Cheetham for printing	25	75
Dec.	22	For copying the writing of the patent	15	00
1809				
Jan.	22	For the patent	30	00
Feb.	1	To Mr. Milligan for binding the patent	8	00
"	4	A Mahogany box to contain the patent	3	00
Mch.	4	To Mandivil the pilot of the N. R. boat	7	00
"	13	To Capt. Wisnell a Cheque .	150	00
"	23	Mr. Stowdenger a Cheque .	120	00
Apr.	8	Mr. Cheetham for printing .	14	56
"	22	To Bachelar the Blacksmith	50	00
"	20	To Mr. Clogson Attorney at law	20	00
"	24	Mr. Jenkel for insurance against fire—one year . .	150	00
			598	31

	Carried forward	598	31

FOR THE NEW BOAT

June 9	To Mr. Revere for Copper .	4259	00
	To Do " Copper Rivets	195	40
	To Mr. Smallman for the steam engine	2450	00
	To Mr. Brownne for the Boat	5000	00
	To Bennet the Coppersmith making boiler	200	00
	To Capt. Roorback . . .	50	00
	To Mess. Ogden and Hoffman for Writings	25	00
28	Mr. Rooseveld on Mississippi expedition	600	00
	dollars	13377	81
		6688	90

1809 CASH RECEIVED OF R. R. LIVINGSTON, ESQ.

March 19	2000	
April 20	1000	
June 1	2000	
	5000	
Paid for Wood at Albany . . .	300	
	5300	

TO PAY TO THE NEW BOAT

To Mr. Smallman	900	
To Mr. Brownne	3000	
To Bennet the Coppersmith	1000	
To McQueen for Contract and Labor .	3000	
for Sails, furniture and Sundries . .	3000	
	10900	
paid—	12779	51
	23679	51

The final whereabouts of the pioneer vessel remains a mystery. It has been asserted that she was finally transported as *The Henrietta* to the Cape Fear River, North Carolina, where Fulton himself as early as 1813 had suggested the formation of a steam-navigation company. Another authority, Mr. J. Seymour Bullock, states that the boat was broken up, when further important improvements rendered her antiquated shape and construction unequal to the increased traffic upon the

river, and that the "ribs" of the hull were used under the wharf in Jersey City where the Secor Foundry built monitors during the Civil War.

A third statement that the boat was sunk off Poughkeepsie, is of doubtful authenticity. Fulton, with his usual thrift, probably incorporated the useful parts of the *Clermont* in a boat of later construction.

Fulton's own definition of his priority in the invention of the steamboat is contained in an interesting paper, now in possession of Judge Peter T. Barlow. In a letter to Joel Barlow the inventor asks him to obtain the signature of William Thornton, Clerk of the Patent Office, to a deposition, and writes in part:

New York, June 28th, 1811.

Dear Barlow:

"My whole time is now occupied in building North River and Steam ferry boats, and in an interesting lawsuit to crush 22 Pirates who have

clubbed their purses and copied my boats and have actually started my own Invention in opposition to me by running one trip to Albany: her machinery however gave way in the first voyage and she is now repairing, which will detain her I presume until we obtain an Injunction[1] to stop her. A more infamous and outrageous attack upon mental property has not disgraced America. Thornton has been one of the great causes of it. In this interesting suit which places a great fortune at stake I want you to do two things for me immediately. First go or send Lee to Thornton's office and demand a certified copy of my transfer of one half of my United States patents to Robert R. Livingston and let the certificate state that such transfer is legally registered in the patent office,—it may be certified by a Notary Public.[2]

The absorbing demands of the *Clermont* deterred Fulton from undertaking other important projects. President

[1] This injunction was obtained, and the Albany boats were confiscated.

[2] For the full text of this highly interesting document, see Appendix, pages 350-353.

Jefferson, who had been interested in Fulton's treatise on Canal Navigation, and who had enjoyed a correspondence with him on this and kindred subjects, proposed at this time that he should examine the ground and report on a canal to unite the Mississippi River with Lake Pontchartrain. In his reply to the Secretary of War, Fulton speaks specifically not only of the building of the *Clermont* but also of the Torpedo project which he had already offered to the American nation. This letter, in possession of the estate of Cornelia Livingston Crary, Fulton's daughter, has never before been published. An extract is here given:

Philadelphia, March 20th, 1807.

To General Dearborn, Secretary of War,—

Dear Sir:

I am infinitely obliged by the proposal of the President that I should examine the ground

and report on a canal to unite the waters of the Mississippi and Lake Pontchartrain, And am sorry I cannot undertake a work so interesting and honourable. The reason is I have now Ship Builders, Blacksmiths and Carpenters occupied at New York in building and executing the machinery of my Steam Boat, And I must return to that City in ten days to direct the work till finished, which probably will require 4 months. This enterprise is of much Importance to me individually and I hope will be of great use in facilitating the navigation of some of our long rivers. Like every enthusiast I have no doubt of success. I therefore work with ardor, and when adjusting the parts of the machine, I cannot leave the men for a day. I am also preparing the engines for the experiment of blowing up a Vessel in the harbour of New York this Spring. The machines for this purpose are in great forwardness and I hope to convince the rational part of the inhabitants of our cities, that vessels of War shall never enter our harbours or approach our Coasts but by our consent. Thus I hope I am usefully employed for 6 or 9 months— . . . . . .

Yours truly,

Robt. Fulton.

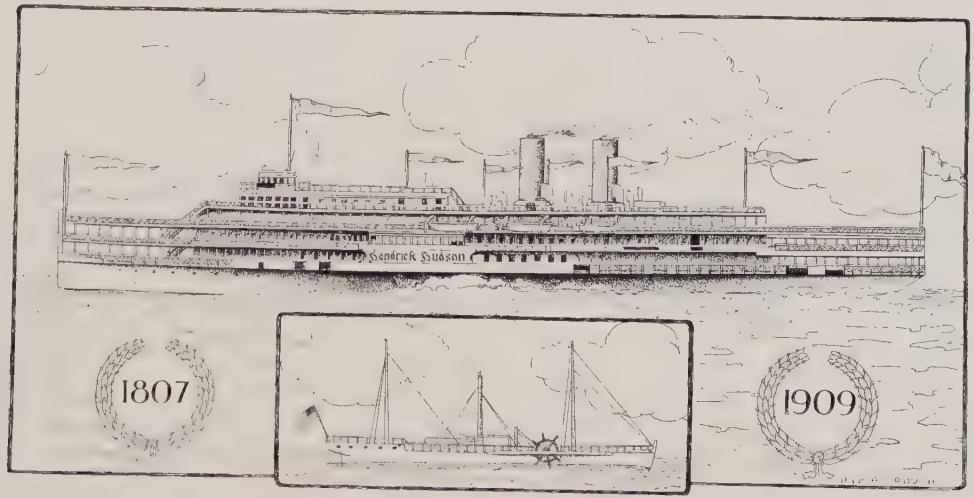
Three days earlier, Joel Barlow, who was always in Fulton's confidence, wrote to his wife:

The President wants Toot [Fulton] to go immediately to New Orleans to survey the ground for a great canal there. Mrs. Dearborn says her home is high, airy and healthy, that you must come on with Fulton as far as here in the little phaeton & pass the summer with her, either here or jaunting a little about in these regions. Fulton, they say, is to be back in July, and then if it is thought best to go north, it can be done, as he may then be going to operate in N. York. All this is only thrown out to think on.

He adds this postscript to Fulton:

Toot, don't give an answer to Gen'l. Dearborn's letter of yesterday till I come. He does not expect it till then.

One hundred years has but served to emphasize the wisdom of "Fulton's



A MODERN STEAMBOAT ON THE HUDSON RIVER AND THE *CLERMONT*

Folly." Before the death of the inventor in 1815, eight years after the *Clermont* steamed up the Hudson, he had built no fewer than seventeen boats, which list includes the first steam war frigate, the torpedo boat, and the first steam ferry-boats, the latter equipped with rounded ends for approach at either shore and floating docks to receive them.

FULTON'S PLANS FOR STEAM NAVIGATION UPON FOREIGN WATERS

Energetic to the last degree of activity, Fulton not only introduced steam navigation upon the chief rivers of America but also contemplated its introduction upon foreign rivers.

A letter at the Lenox Library, in the Thomas Addis Emmet collection, shows that in 1812 Fulton signed a joint con-

tract with a certain Thomas Lane to introduce steamboats in India. He writes:

I agree to make the Ganges a joint concern—the work is so honorable and important. It is so grand an Idea that America should establish steam vessels to work in India that it requires vigor activity, exertion, industry, attention and no time should be lost. My *Paragon*[1] beats everything on this globe, for made as you and I are, we cannot tell what is in the moon—this Day she came on from Albany 160 miles in 26 hours, wind ahead.

Four days earlier, Fulton wrote another letter to Chevalier Svinie (Swinine), a Russian gentleman, then staying in Weymouth Street, London. The letter forwarded by J. Eliot Hodgkin of London, in response to the author's inquiry in "Notes and Queries," is here printed for the first time.

[1] Fulton's boat built in 1811 for service on the Hudson.

New York, April 12, 1812.

CHEVALIER SVINIE,

Sir;

Being inventor of the Steam Boats having a claim on every Government for the use of my invention much superior to that of any other individual, and relying on the respect which the Government of Russia have for the arts, I wrote to Mr. Adams[1] in November last to obtain for me an exclusive right for 20 years on condition that I should cause a steam-boat to be established from Petersburgh to Cronstadt in three years after obtaining the Grant, the considerations proposed to Mr. Adams render it necessary for me to wait his answer; But should he neglect or not obtain the grant, and it should be given to another, It will then be time enough to talk of the terms on which I would go into the enterprise, on which it is impossible for me at present to make up my mind. I am

Sir Respectfully your most obedient,

ROBERT FULTON.

[1] John Quincy Adams, American Ambassador to Russia, 1809-1814.

A second letter upon this proposition is extant from the Chevalier. It is among Fulton's family papers in possession of the estate of his daughter, Cornelia Livingston Crary. M. Swinine says in part:

"Doubtless Sir, it is known to you, that for several months past I have been taken up with your admirable invention of the *steam boat,* dedicating all my knowledge for its introduction in Russia. As you have received the Imperial permission for this introduction, I offer you, Sir, my services, which I flatter myself may be of great utility. Certainly it will be necessary for you to have the plan of the River Neva and of the channel from St. Petersbourg to Cronstadt, to have the clearest information of the value of materials necessary for the construction of the steam

boat, the description of other communications by water in Russia etc. I hope to give you all that and whatever else may be requisite for you in the most agreeable way, as none but myself can satisfy you.

"My demands are limited to the two following agreements:

1st *That your Company* honour me with the title of Superintendent of the Steamboats of Russia.

2nd: That it will grant me on my arrival in Russia an annual salary as may seem most just." [etc.]

At the time of Fulton's death the steamboat *The Emperor of Russia* was in process of building, and in accordance with contract was to be transferred to Russian waters before December 1st. The enterprise was postponed, and was subsequently taken up by other contractors.

ROBERT FULTON

"ROBERT FULTON is going to be a great man this year!" observed a casual appraiser.

"Sir," he was answered, "Robert Fulton was a great man one hundred years ago, or the justice of an American nation would not, at the end of a century, recall his life with gratitude."

With the recognition of Robert Fulton's chief invention, it should be kept in mind that he was deeply interested in the largest problems of humanity. He was not only an inventor, he was also a reformer, a statesman, and a patriot. With splendid courage born of conviction, he enriched the world by original products which he was pleased to term "useful arts" and sometimes "mental property." To forward his plans he gave in unstinted measure,—his time, his talents, his wealth. It is characteristic that in his writings he

capitalized the word "Ideas" and spelled "money" with small initial. Thus as the world gauges success,—he died poor: yet, as a century translates that poverty it becomes golden with the wealth of honor.

APPENDIX

APPENDIX

FULTON'S LETTER TO WATT[1]

(Page 42)

Manchester, Nov. 4, 1794.

MESSRS. BOULTON & WATT,

Gentlemen:

I shall esteem it a favour to be informed of the Expences of a Steam Engine with a Rotative movement of the purchase of 3 or 4 horses, which is designed to be placed in a Boat. You Will be so good as to mention what sized boat it would occupy, as I wish to have it in as little space as Possible, and what you consive will be the Expence when finished Compleat in the Boat. Whether you have one ready of the dimentions specified or how soon one might be finished.

[1] In possession of George Tange, Esq., of Birmingham.

With Weight of Coals which it will consume in 12 hours, and what Quantity of purchase you allow to each horse, as I am anxious to supply some Engines of the above dimentions as soon as Possible. Your Emediate Answer will much oblige

Your Most obedient and very humble Servant,

ROBT. FULTON.

Bridgewater Arms, Manchester.

FULTON'S TREATISE ON CANAL NAVIGATION (Page 48)

A copy of the "Treatise" in the Lenox Library contains a four-page letter to General Bonaparte from the author. In. his preface Fulton says:

The fear of meeting the opposition of envy, or the illiberality of ignorance is, no doubt, the frequent cause of preventing many ingenious men from ushering opinions into the world which deviate from common practice. Hence for want of energy, the young idea is shackled with timidity and a useful thought is buried in the im-

penetrable gloom of eternal oblivion. But if we consider for a moment, how much men are the sons of habit, we shall find that almost the whole operations of society are the produce of accident and a combination of events, rendered familiar by custom, and interwoven into the senses by time: insomuch that it is a mere chance if the ideas are awakened to a sense of particular errors. But in such case, it is fortunate when they arise in a mind active to investigate and which feels only contented to rest on the basis of reason: for without this, man must ever remain in a fixed point and improvement will be at an end: the adventurer must, therefore, arm himself with fortitude to meet the attacks of illiberality and prejudice, determined to yield to nothing but superior reason; resting assured that every virtuous mind will commend an exertion to remove the rubbish from around the Temple of Truth, even should the undertaking fail. . . . The mechanic should sit down among levers, screws, wedges, wheels, etc., like a poet among the letters of the alphabet, considering them as the exhibition of his thoughts; in which a new arrangement transmits a new idea to the world. It is for want

of this discrimination that many a worthy man of easy demeanor is tormented by the criticism of ignorant insignificance; for men of the least genius are ever the first to deprecate and the last to commend: and for an obvious reason, they have not sense to know the produce of genius when they see it.

THE WASHINGTON LETTER
(Page 50)

The letter to President Washington, now in the possession of the Historical Society of Pennsylvania, is reproduced here for the first time.

London, Sept. 12th, 1796.

To His Excellency, George Washington,
President of the United States:

Sir: By my friend Dr. Edwards I beg leave to present you with this publication; which I hope will be honoured with your Perusal at a liesure hour: The object of which is to Exhibit the Certain mode of Giving Agriculture to every Acre of the immense Continent of America; By means of a Creative System of Canals.

APPENDIX

When this Subject first entered my thoughts, I had no Idea of its Consequence. But the scene gradually opened and at Length exhibited the most extensive and pleasing prospect of Improvements: hence, I now consider it of much national Importance; And View it like the application of those particular principles which produce certain effects.

Thus the discovery of the Mariner's Compass Gave Commerce to the World.

The Invention of printing is dissipating darkness and giving a Polish to the Mass of Men.

And the Introduction of the Creative System of Canals as certain in their Effects will give an Agricultural Polish to every Acre of America. I therefore Beg Leave to Submit to your Contemplation the Last Chapter with the Supplement; which exhibits the Specific System for America: And hoping that your Excellencie's Sanction will awaken the Public attention to the Subject:

I Remain with all possible Respect, your Excellencie's Most Obedient & Very Humble Servant

ROBERT FULTON.

APPENDIX

Among the Washington papers in the Library of Congress is this reply:

Philad. 14th Decr 1796.

Robert Fulton Esqr.

Sir,

By the hands of Doct. Edwards I was favored with your Treatise on the improvement of Canal Navigation. For your goodness in sending it to me I pray you to accept my best thanks.

The subject is interesting and I dare presume is well treated, but as the Book came to me in the midst of busy preparatory scenes for Congress I have not had liesure yet to give it the perusal which the importance of such a work would merit. I shall do it with pleasure I am persuaded when I have.

With Esteem I am Sir

Your obt & Obliged

& Hble Servt

G°: Washington.

APPENDIX

FULTON'S EXPOSITION OF HIS CANAL SCHEME SET FORTH IN HIS LETTER TO WASHINGTON

(Page 66)

The following letter to President Washington, written early in the year Fulton went to Paris, is in the archives of the Congressional Library:

London, Feby. 5th, 1797.

Sir: Last evening Mr. King presented me with your Letter acquainting me of the Receipt of my publication on Small Canals, which I hope you will Soon have time to Peruse in a tranquil Retirement from the Buisy operations of a Public Life: Therefore Looking forward to that period when the whole force of your Mind will Act upon the Internal improvement of our Country, by Promoting Agriculture and Manufactures: I have little doubt but easy Conveyance, the Great agent to other improvements will have its due Weight And meet Your patronage.

For the mode of Giving easy Communication to every part of the American States, I beg Leave to draw your Particular attention to the

Last Chapter on Creative Canals; And the expanded mind will trace down the time when they will penetrate into every district Carrying with them the means of facilitating Manuel Labour and Rendering it productive. But how to Raise a Sum in the different States, has been my Greatest difficulty. I first Considered them as national Works. But perhaps An Incorporated Company of Subscribers, who Should be Bound to apply half or a part of their profits to extension would be the best mode, As it would then be their Interest to Promote the work: *And Guard their emoluments.*

That Such a Work would answer to Subscribers appears from Such Information as I have Collected; Reletive to the Carriage from the Neighborhood of Lancaster, to Philadelphia. To me it appears that a Canal on the Small Scale might have been made to Lancaster for 120 thousand £ and that the Carriage at 20 Shillings per ton would pay 14 thousand per Annum, of which, 7,000 to Subscribers and 7,000 to extension. By this means in about 10 years they would touch the Susquehanna, and the trade would then so much increase as to produce 30,000 per

Annum, of Which 15,000 to Subscribers, the Remainder to extension; Continuing thus till in About 20 Years the Canal would Run into Lake Erie, Yielding a produce of 100,000 per annum or 50 thousand £ to Subscribers, which is 40 per Cent; hence the Inducement to Subscribe to such undertakings.

Proceeding in this manner I find that in about 60 or 70 years Penselvania would have 9360 Miles of Canal, equal to Bringing Water Carriage within the easy Reach of every house, nor would any house be more than 10 or 14 Miles from a Canal: By this time the whole Carriage of the country would Come on Water even to Passengers—and following the present Rate of Carriage on the Lancaster Road, it appears that the tolls would amount to 4,000,-000 per year. Yet no one would pay more than 21 shillings and 8d. per ton, whatever might be the distance Conveyed, the whole would also *be pond Canal*, on which there is an equal facility of conveyance each way. Having made this Calculation to Show that the Creative System, would be productive of Great emolument, to Subscribers, It is only further to be observed that if each State was to Com-

mence a Creative System, It would fill the whole Country, and in Less than a Century bring Water Carriage within the easy Cartage of every Acre of the American States,—Conveying the Surplus Labours of one hundred Millions of Men.

Hence Seeing that by System this must be the Result, I feel anxious that the Public mind may be awakened to their true Interest: And Instead of directing Turnpike Roads towards the Interior Country, or expending Large Sums in River navigations—Which must ever be precarious and lead [— —] I Could wish to See the Labour, and funds applied to Such a System As would penetrate the Interior Country And bind the whole In the Bonds of social Intercourse.

The Importance of this Subject I hope will plead my excuse for troubeling you with So Long a Letter, And in expectation of being Favoured with your thoughts on the System and mode of Carrying it into effect, I Remain with the utmost

Esteem and Sincere Respect
Your Most Obedient Servant
Robt. Fulton.

His Excellency George Washington.

APPENDIX

TRANSLATION:

ROBERT FULTON TO GENERAL BONAPARTE.

ORIGINAL IN LENOX LIBRARY, NEW YORK

(Page 67)

To General Bonaparte.

Citizen General: Citizen Perier having informed me that you would like to have acquaintance with my Work on the System of Small Canals, I take the liberty of presenting you with a copy and shall be happy if you find therein some means of improving the industries of the French Republic.

To this copy I have added two memoirs which I purpose putting before the eyes of the Directory. One relates to the absolutely new system of Small Canals which if it is adopted, will produce the most considerable portion of the public revenue. In the other I try to show the favorable results of this system and at the same time, the necessity of an entire liberty of Commerce.

These plans of improvement and my reflections upon Commerce, are elaborations of the following ideas which I regard as the base of political welfare, and which seem to me worthy of the consideration of all republicans, of all

friends of humanity: Labor is the source of riches of all kinds; it follows that the more numerous the industrious and useful class, the more a country should gain in riches and comfort. It is then to the interest of each Nation to draw from its natural advantages every feature possible. To that end Governments must apply themselves above all to domestic improvements and search continually to increase the number of useful individuals; and only by eliminating as far as possible the causes of war, will men be enabled to devote themselves to industrious works, and reduce beggary.

Among all the causes of wars, it is true, each day sees disappear that which relates to Kings, Priests, and the things which accompany them. But nevertheless Republics themselves will not be exempt from melancholy quarrels, in as much as they do not separate themselves from the erroneous systems of exclusive commerce and distant possessions. Therefore, all who love their fellow men should try to search to destroy these errors. Ambition itself should not search for glory further than to show to men the way of truth, and to set aside the obstacles which hinder nations

from arriving at a lasting peace,—for what glory can survive that does not receive the sanction of Philosophy?

To liberate the nations, Citizen General, you have executed vast enterprises, and the glory you have achieved should be as durable as time. Who then could render a more efficacious approval of the projects which can contribute to the general welfare? It is with this idea that I submit my work to you, hoping that if you find there some useful truths you will vouchsafe the support of your powerful influence, and in fact, favor projects the execution of which should render more happy millions of men. Could virtuous genius find a more delightful satisfaction? It is from this point of view that interior improvements and liberty of commerce become of the highest importance.

If success crowns the efforts of France against England, it will only remain for her to terminate gloriously this long war by according liberty to commerce and by compelling other powers to adopt this system. Political liberty would thus acquire that degree of perfection and of extent of which it is susceptible, and Philosophy would see with joy the Olive

Branch of Eternal Peace Sheltering Science and Industry. With salutation and respect,

ROBERT FULTON.

PARIS, 12 FLORÉAL, AN 6

LETTER FROM ROBERT FULTON TO JOSHUA GILPIN, DATED PARIS, NOVEMBER THE 20TH, 1798

(Page 72)

I thank you for . . . Mr. Chapman's observations on my system of small canals—which observations I expect will tend to bring the subject to discussion and Render its importance understood. . . . But for the pleasure of Seeing my Canal system stand in its true Light I look to America, and to America I look for the perfecting of all my plans—which plans are not numerous but their Consequences perhaps may be immense on the future improvement and happiness of America. The plan of my *Nautilus* [Fulton's plunging boat] you say is not liked, this must be because its Consequences are not understood. The Idea is yet an Infant, but I think I see in it all the nerve and muscle of an Infant hercules which

at one grasp will Strangle the Serpents which poison and Convulse the American Constitution.

Every man who has the least pretension to expanded Reflection and a Knowledge of the interest of nations must admit that a perfect free trade is of the utmost importance, but a free trade or in other words a free Ocean, is particularly Important to America. I would ask anyone if all the American difficulties during this war is not owing to the Naval systems of Europe and a Licensed Robbery on the ocean? how then is America to prevent this? Certainly not by attempting to build a fleet to cope with the fleets of Europe, but if possible by Rendering the European fleets useless. A letter has not Room for much on this head, my Reasons on the Subject shall make their appearance in time, and I hope in manner which will Carry Conviction—From what I have heard, some of my friends fear that I may become an instrument in the hands of party—but of this I believe there is not the least danger. If I know myself I believe I am much governed by my own Contemplations which Contemplations I believe always tend to pro-

mote the Interests of Mankind—at least Such is my wish and I Cannot unite with any party or polity nor will I aid them unless I Clearly see that an obstacle between Society and a Lasting peace or improvement Can be Removed.

Remember me with the utmost affection to Mr and Mrs West tell them how much I love them, and wish to imitate their Social Virtues. I am happy Ralph has gone to America where I hope to return early in the Spring.

Remember me also to Mr Cartwright's family, with Regard to his engines I will write him.

FULTON'S LETTER TO THE DIRECTOR OF THE COMMISSION. FRENCH ORIGINAL IN THE BRITISH MUSEUM. [TRANSLATION]

(Page 78)

CITIZEN DIRECTOR: From the report of the Commissioner named by the Minister of the Marine, it would seem that the machine and the means by which I have proposed to destroy the English Fleet, are pronounced to be practicable,—Permit me then to recall to your con-

sideration the consequences which should result from the success of this enterprise. The enormous commerce of England, no less than its monstrous government, depends upon its military marine. However if their vessels of war are destroyed by means so novel, so hidden and so incalculable, the confidence of the sailors will be destroyed, and the fleet rendered useless in the first moment of its terror. In such a state of affairs the Republicans in England would rise to facilitate a descent of the French, or would change their government of themselves without shedding much blood and without any expense to France. With England Republicanized, the seas will be free. The liberty of the seas would become a guarantee of perpetual peace to all maritime nations.

By such a peace France will gain more than any other nation, because of her great population and the immensity of her resources. Only then will humanity perceive, how priceless are the principles for which the French have expended prodigies of their blood, in all their miracles of bravery.

If at first glance, the means I propose seem revolting, it is only because they are extraor-

dinary. They are anything but inhuman; it is certainly the most peaceful and least bloody mode that the philosopher could imagine to overturn the system of plunder and of perpetual war, which has always vexed the maritime nations: To give, at last, peace to the earth, and to restore men to their natural industries, and to a happiness, until now, unknown. I salute you with respect,

ROBERT FULTON.

6 BRUMAIRE, AN 7.

FULTON'S SUGGESTIONS TO THE FRENCH COMMISSION APPOINTED BY NAPOLEON, FOR THE USE OF HIS TORPEDO INVENTION

(Page 95)

Having given you a short Sketch of the Succession of my Experiments, the mode of using these inventions against the enemy is now to be considered. On this Point, time and experience will make numerous improvements, As in all other new inventions and discover modes of operation which could not possibly occur to me. When powder was invented, its infinite

applications were not thought of, nor did the Inventors of the Steam Engine conceive the numerous purposes to which I[t] could be applied. In like manner it is impossible at present to see the various modes, or the best method of using a plunging boat or the Bomb Submarine. But as far as I have reflected on this point, I conceive the best operation to be as follows:

First.

To construct one or two good plunging boats each 36 feet long and 12 feet wide. Boats of this capacity would be sufficient to contain 6 men and air for 8 hours. With provisions for [*here the paper is torn*] days and transport from 25 to 30 Bombs at a time. Their cylinders should be Brass and of a strength to admit of descending 60 or 80 feet under water in case of need. And they may be constructed to sail from 5 to 7 miles an hour; Hence it may be well to observe that; Quick sailing is not one of the most important considerations in this invention. If such a boat is pursued, she plunges under water, and as She can remain under Water from 4 to 8 hours and make at least

one Mile per hour, She could rise Several miles from the place where she plunged to renew her air. Thus the enemies ports could be approached And particularly under the cover of the Night. Nor do I at present see that any possible vigilance could prevent these invisible engines entering their ports and returning at pleasure.

Second.

Let there be also some hundreds of Bombs Submarine constructed of which there are two sorts,—one arranged with clockwork in such a manner as to go off at any given period, from 4 minutes to 4 hours. The other with a Gun lock as before mentioned, so as to go off when it strikes against a vessel or when a vessel runs against it. Each of these carcasses is arranged so as to float from 4 to 15 feet under water in proportion to the water which the Vessels to be attacked, draws. And in this there are two advantages, the first is that the bomb is invisible, —the second is that when the explosion takes place under water, the pressure of the column of water to be removed forces the whole action of the powder against the vessel: It was the re-

sistance of the water which caused the sloop on which I proved the experiment, to be reduced to atoms: for water, when struck quick, such as the stroke of a cannon ball or the expansion of powder, acts like a Solid; and hence the whole force was spent on the Sloop, or rather passed through the sloop in finding its passage to the air by the perpendicular and shortest line of resistance. The same effect would no doubt be produced on a vessel of any dimensions by applying a proportionate quantity of powder, such as 2, 3 or 4 hundred weight.

Therefore being prepared with plunging boats and Bombs Submarine, let the business of the boats be to go with cargos of bombs and let them loose with the current into the harbours of Portsmouth, Plymouth, Torquay or else where. Those with their graplings floating under water could not be perceived. Some would hook in the cables, bow or stern, or touch in their passage: many, no doubt, would miss but some would hit, go off and destroy the vessels they touched. One or more vessels destroyed in a Port by such invisible agents would render it too dangerous to admit of any vessel remaining. And thus the enemy may at all

times be attacked in their own Ports, and by a means at once cheap, simple, and I conceive, certain in its operation.

Another mode would be to go with cargoes of bombs and anchor them in the entrance of rivers so as to cut off or blockade the commerce. 2 or 3 hundred, for example, anchored in the Thames or the Channels leading to the Thames would completely destroy the commerce of that river and reduce London and the Cabinet of St James to any terms. No pilot could steer clear of such hidden dangers,—no one dare to raise them even if hooked by grapplings, as they could not tell the moment they might touch the Secret Spring which would cause the explosion and destruction of everything around them. No vessel could pass without the utmost danger of running on one of them and Her instant destruction. If this measure should ever become necessary some Vessels will most certainly be destroyed and their destruction alarm the whole commerce of the Thames. By this means the Thames may be blockaded and the trade of London completely stopped,—nor can the combined fleets of England prevent this kind of attack. And this is

perhaps the most simple and certain means of convincing England that Science can put her in the power of France and of compelling Her to become a humble pleader for the liberty of the seas, which She now denies to her neighbors.

I therefore conceive that it will be good policy to commence as soon as possible the construction of the boats and bombs. If they can be finished before the arrival of Peace their effects may be proved during this War. Should Peace be concluded before they are finished the experiments can be continued. Men can be exercised in the use of the engines. And it is possible in a few years England will see it Her best policy never to give France reason to exercise this invention against her. If England cannot prevent the blockade of the Thames by the means of plunging boats and Bombs Submarine, of what use will be to her her boasted Navy? The free navigation of the Thames nourishes the immense commerce of London, and the commerce of London is the Nerve and Vitals of the Cabinet of St James. Convince England that you have the means of stopping that source of riches, and she must submit to your terms. Thus, Citizens, I have presented

you with a short account of my experiments and Plan for using this invention against the Enemy, hoping that under your protection it will be carried to perfection and practised to promote the Liberty of the Seas. Health and Sincere Respect.

ROBERT FULTON.

ACCOUNT OF FULTON-LIVINGSTON PARTNERSHIP (Page 117)

Chancellor Livingston's account of the Fulton-Livingston partnership, which he drew up for the "American and Philosophical Register," is in part as follows:

Robert R. Livingston, when minister in France, met with Mr. Fulton and they formed that friendship and connexion with each other, to which a similarity of pursuits generally gives birth. He communicated to Mr. Fulton the importance of steamboats to their common country; informed him of what had been attempted in America, and of his resolution to resume the pursuit on his return, and advised him to turn his attention to the subject. It was

agreed between them to embark in the enterprise, and immediately to make such experiments as would enable them to determine how far, in spite of former failures, the object was attainable. The principal direction of these experiments was left to Mr. Fulton, who united in a very considerable degree, practical, to a theoretical knowledge of mechanics. After trying a variety of experiments on a small scale, on models of his own invention, it was understood that *he* [Mr. Fulton] had developed the true principles upon which steamboats should be built, and for the want of knowing which all previous experiments had failed. But as these two gentlemen both knew that many things which were apparently perfect when tried on a small scale, failed when reduced to practice upon a large one, they determined to go to the expense of building an operating boat upon the Seine. This was done in the year 1803, at their joint expense, under the direction of Mr. Fulton; and so fully evinced the justice of his principles, that it was immediately determined to enrich their country by the valuable discovery, as soon as they should meet there, and in the meantime to order an engine to be

made in England. On the arrival at New York of Mr. Fulton, which was not until 1806, they immediately engaged in building a boat of, what was then considered, very considerable dimensions.

FULTON'S NOTES ON M. DES BLANC'S PATENT (1802)

(Page 128)

This imperfection makes me believe that M. Des Blanc has not found the proportion which his paddles should bear to the bow of the boat, or the velocity which they should run in proportion to the velocity which the boat is intended to go.—Consequently if he has not known the proportions and velocities he has not mounted or deposited a description by which an artist could construct a Boat to go any given number of miles an hour nor in fact has he shown the means of constructing a boat which can be of use. He has left the proportions and velocities to be discovered. He has not given any rule to make a boat of any given dimensions, go any given distance in a given time, and hence he has not as yet mounted a

boat to navigate by steam in such a manner as to be of use to society; for this invention to be rendered useful does not consist in putting oars, paddles, wheels or resisting chains in motion by a steam engine—but it consists in showing in a clear and distinct manner that it is desired to drive a boat precisely any given number of miles an hour—what must be the size of the cylinder and velocity of the piston? What must be the size and velocity of the resisting chains? All these things being governed by the laws of Nature, the real Invention is to find them.—Till the artist knows the necessary proportions to this and all other sized boats he must work in the dark and to great uncertainty, and can not be said to have made any clear and distinct discovery or useful invention.

In a paper entitled, "Observations on Moving Boats by Machinery," after a technical review of several experiments, Fulton summed his conclusions thus:

I am inclined to think that if each of the here mentioned methods are minutely examined

it will be found impossible to drive a boat 8 miles, and perhaps not 6 miles an hour, by such application of the power—and it appears to me that it has been owing [to] such defective applications of the power and not to any defect in the steam engine, that the experiments hitherto made have failed.[1]

He defined specific errors in Rumsey's attempt in a section of his note-book entitled, "Messrs. Parker & Rumsies experiment for moving boats." After a consideration of their several points, in the form of question and answer, he avers:

It therefore appears that the Engine was not loaded to its full power, that the water was lifted four times too high and that the tube by which the water escaped was more than five times too small.

Reviewing the inconvenience and inadequacy of their proposed method of steam application, Fulton continued:

To see clearly the error of this mode of mov-

[1] Unpublished paper in the estate of Fulton's daughter, Cornelia Livingston Crary.

ing boats, it is necessary first to know exactly how much power is lost by forcing a large column of water through a small aperture. And for this purpose perhaps some experiments must be made. However it is clear that to the less height the Water is raised the more of the power of the Engine must be lost in raising the water above its natural level, and to say nothing of loading the Vessel with Water. In my opinion the power of the Engine cannot be applied to advantage by this means.

LETTER TO SKIPWITH

Extract from a letter of Robert Fulton to Fulner Skipwith, dated Paris, September 20, 1802. In possession of Charles Henry Hart, of Philadelphia.

(Page 146)

"The expense of a patent in France is 300 livres for three years, 800 ditto for ten years, and 1500 ditto for fifteen years. There can be no difficulty in obtaining a patent for the mode of propelling a boat which you have shown me; but if the author of the model wishes to be as-

sured of the merits of his invention before he goes to the expense of a patent, I advise him to make a model of a boat in which he can place a clock spring, which will give about eight revolutions. He can then combine the movements so as to try oars, paddles, and the leaves which he proposes. If he finds that the leaves drive the boat a greater distance in the same time than either oars or paddles, they consequently are a better application of power. About eight years ago, the Earl of Stanhope tried an experiment on similar leaves, oars and paddles, and found oars to be the best. The velocity with which a boat moves is in proportion as the sum of the surfaces of the oars, paddles, leaves or other machine is to the bow of the boat presented to the water, and in proportion to the power with which such machinery is put in motion. . . . If the author of the model is fond of mechanics, he will be much amused and not lose his time by trying the experiment in the manner I propose, and this perhaps is the most prudent measure before a patent is taken. I am, Sir, with much respect,

Yours,

Robert Fulton.

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FULTON'S LETTER TO THE FRENCH COMMISSION

(Page 144)

A translation of this letter which has appeared in "Cassier's Magazine" is here given by the courtesy of the Editor.

Paris, 4 Pluvoise, Year XI
(25th January, 1803)

Robert Fulton to Citizens Molar, Bandell, and Montgolfier, Friends of the Arts:

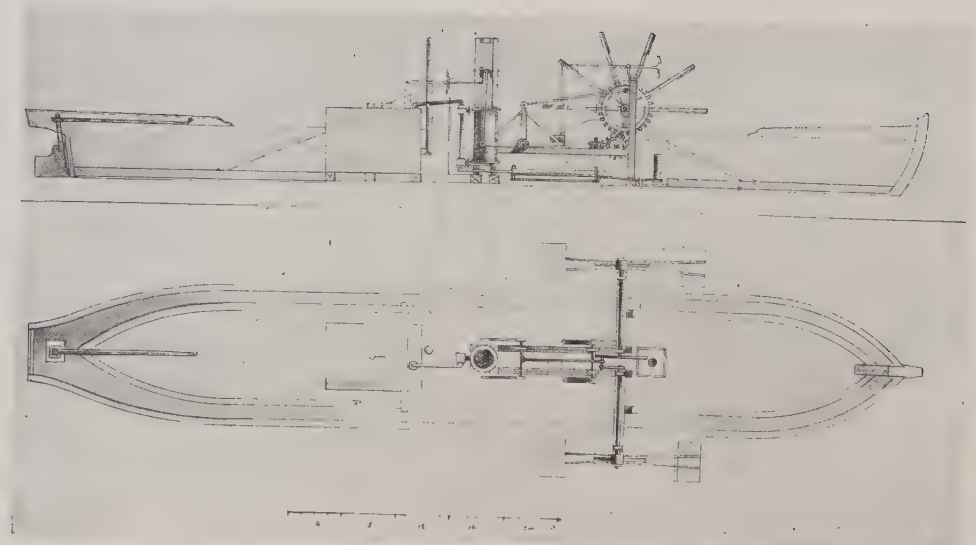
I send you herewith sketch designs of a machine which I am about to construct with which I propose soon to make experiments upon the towing of boats upon rivers by the aid of fire-engines. My original object in attempting this was to put it in practice upon the great rivers of America where there are no roads suitable for hauling nor indeed are any hardly practicable, and where in consequence the cost of navigation by the aid of steam would be put in comparison with the labour of men and not with that of horses as in France.

You can see that such a discovery if successful, would be infinitely more important in America than in France where there exist everywhere

roads suitable for hauling, and companies established for the transport of merchandise at such moderate charges that I doubt very much if a steamboat, however perfect it might be, could be able to gain anything over horses for merchandise. But for passengers it is possible to gain something because of the speed.

In these plans you will find nothing new, since this is not the case with paddle wheels, an appliance which has often been tried and always abandoned because it was believed that it had a disadvantageous action in the water. But after the experiments which I have made already I am convinced that the fault is not in the wheel, but in the ignorance concerning its proportions, its speed, the power required and probably in the mechanical combination.

I have proved by very accurate experiment that paddle wheels are much to be preferred to bands of paddles, and in consequence, although the wheels are not a new application, yet nevertheless I have combined them in such a manner that a large portion of the power of the engine acts to propel the boat in the same way as if they rolled upon the ground; the combina-



FULTON'S DRAWING FOR A STEAMBOAT SUBMITTED TO THE COMMISSION APPOINTED BY NAPOLEON IN 1803

From the original drawing in the Conservatoire Des Arts et Métiers, Paris. From a photograph lent by "Cassier's Magazine"

tion is infinitely better than anything which has yet been done up to the present time, and it is, in fact, a new discovery.

For the transport of merchandise I propose to use a boat with an engine arranged to draw one or several loaded barges, each one so close to the preceding one that the water can not flow between to make resistance. I have already done this in my patent for small canals and this is indispensable for boats moved by fire-engines. (See second illustration on p. 336.)

Suppose the boat A with the engine, presents to the water a face of 20 feet, but inclined at an angle of 50 degrees, it will be necessary to have a machine of 420 pounds power making 3 feet per second to move one league per hour in still water. If the boats B and C have their faces parallel to that of A they will each also require a force of 420 pounds that is to say 1200 pounds for the three, which if they are connected in the manner in which I have indicated, the force of 420 will suffice for all, and this great economy of power is too important to be neglected in such an undertaking.

APPENDIX

Citizens:

When my experiments are ready I shall have the pleasure to invite you to see them, and if they are successful I reserve the privilege of presenting my labours to the Republic or of taking for them such advantages as the law may authorize. At the present time I place these notes in your hands in order that if any similar project comes before you before my experiments are completed, they shall not have the preference over mine.

With respectful salutations,

Robert Fulton.

No. 50 Rue Vaugirard.

THE FULTON PATENTS

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The United States Patent Office has recently stated that while the Index of Patents says that on February 9, 1811, a patent was issued to Robert Fulton, the office is unable to furnish a copy of it, as the records of this and other early patents were destroyed in the Patent

Office fire of 1836. It is well established, however, that Fulton's first United States patent was obtained February 11, 1809, and a supplementary patent February 9, 1811.

In his Notes on the Patent of 1809, in possession of one of his heirs, Fulton claimed that the essential parts of his invention of the steamboat were fourteen in number:

"First: The mode of communicating the power from the piston rod of the engine to the water wheels without the common beam and in such a manner as not to strain or impair the boat.

Second: I am the first who discovered the superiority of water wheels over other modes for gaining a purchase on the water, and I am the first who applied water wheels to a steam boat. They are described in the specification, one on each side of the boat and their number of arms, diameter, and size of propelling boards minutely detailed.

Third: The wheel guards around them are also detailed.

Fourth: I have shown that steamboats must be built four or more times the length of their

breadth of beam; all sloops and river craft are three times the length of their breadth of beam.

Fifth: The bow and stern should be sharp to angles of at least 60 degrees. The bow should not be full like sloops, for two reasons; that being long they cannot rise on the waves like sloops but must cut through them, and being sharp the resistance is less.

Sixth: After mentioning the combinations the success in building a steamboat depends upon knowing how to calculate the resistances, the proportions, and velocities of the parts and for this purpose the rules are laid down exact, in

Seventh: A table of the resistance of the water and how to calculate the total resistance of the boat while running from one to six miles an hour, unless this be first ascertained it would be impossible to tell what strength of steam engine would be required.

Eighth: The specifications show the power necessary to drive the boat and the power consumed by taking the purchase on the water and thus arriving at the whole power required the power of the steam engine may be calculated.

Ninth: Shows the size of the cylinder, the piston running two feet a second.

Tenth: Shows the diameter and velocity of the water-wheels.

Eleventh: Shows the size of the propelling boards.

Twelfth: I am the first who combined sails with steam to drive a boat.

Thirteenth: Shows the steering wheel and pilot near the middle of the boat and over the station of the engineer.

Fourteenth: How to get the merchandise in steamboats up rapids."

DE WITT'S DESCRIPTION OF FIRST STEAMBOAT
(Pages 342-345)

A detailed description of the first steamboat was deposited in 1858, at the New York Historical Society by Richard Varick De Witt, of Albany, whose familiarity with the boat dated from earliest boyhood when each week he had seen it tied at the wharf opposite his home. This account coincides with the main points, as set forth by Mr. Fulton himself in his brief description, already quoted, and is indorsed as authentic by Mr. Riley Bartholomew, an officer of the boat.

APPENDIX

Description of the Steam Boat *North River* of *Clermont*

The old *North River*, as it was familiarly called, was an enlargment and reconstruction of the *Clermont*, the experimental vessel first built by Mr. Fulton.

The hull must have been about 150 feet long and 18 wide and about 8 feet deep from the bow for 126 feet. Thence for 24 feet the stern was elevated above the main deck about three feet forming a quarter deck which covered the Ladies Cabin and the lobby between that cabin and the main or dining cabin. The descent into this lobby was by 3 or 4 steps in the centre of the vessel. The star board corner of the lobby formed the captain's office, the larboard corner the passage into the dining cabin. In front of the Engine Room which occupied the waist of the vessel, was a small front cabin, and between that and the bow a forecastle for the crew. The engine occupied the centre of the room leaving space on one side for a kitchen and on the other for a pantry and bar.

The Ladies Cabin	contained	6	upper	and	4	lower	berths.
The Main Cabin	"	14	"	"	14	"	"
The foreward Cabin	"	8	"	"	8	"	"

The boat was rigged with a small mast passing up through the quarter deck carrying a boom and gaff main sail and a larger mast and top mast forward of the engine, carrying a foreguard and square sail, over which was set a flying top sail. On a fore stay extending to a short bow-sprit, was a jib, and studding sails were at times carried from the yard, having booms projecting from the gunwale of the boat. The foremast was fitted between upright standards which rose from the keel to 6 feet above the deck, and the mast was pivoted between them so as to be lowered down upon the bowsprit during head winds.

A pair of yawls, for the landing of passengers were hung on iron cranes on each side of the main deck aft, and the space where the wheel guards finish aft into the hull were shaped into steps, to facilitate the passage into and from the boats when in the water.

The boiler was between the engine and main cabin, its top being covered with a slightly elevated deck. The Engine (one of Watt and Boultons, double acting condensing) consisted of a cylinder with a piston 2 feet in diameter, having a stroke of 4 feet, standing upon an iron condenser. In front of the cylinder stood the

air pump [drawing]. On the top of the piston rod was an iron cross head sliding between guides on the gallows frame, which reached from the bottom framing of the vessel to some 12 feet above its deck. From the cross head down on each side of the cylinder depended a rod the lower end of which was pivoted to the end of a bell crank lever. The fulcrum and axis of the levers lying in front of the cylinder [drawing]. The other arms of these levers, being bent upward and at right angles to the first levers, the pitmans or shackle bars, were pivoted to their upper ends. The shackle bars extended forwards and their front ends were pivoted to the peripheries of crank wheels attached to the inboard ends of the water wheel shafts. These wheels were toothed and cogged into the teeth of pinion wheels affixed to the axis of a fly wheel, which revolved in the centre of the engine. The valves of the cylinder were poppet valves operated by the clack gearing, then in use.

The steering was done by a wheel placed between the gallows frame and the smoke pipe the wheel ropes passing along the sides of the vessel, to a standard attached to the tail of the rudder blade which was a flat board of about

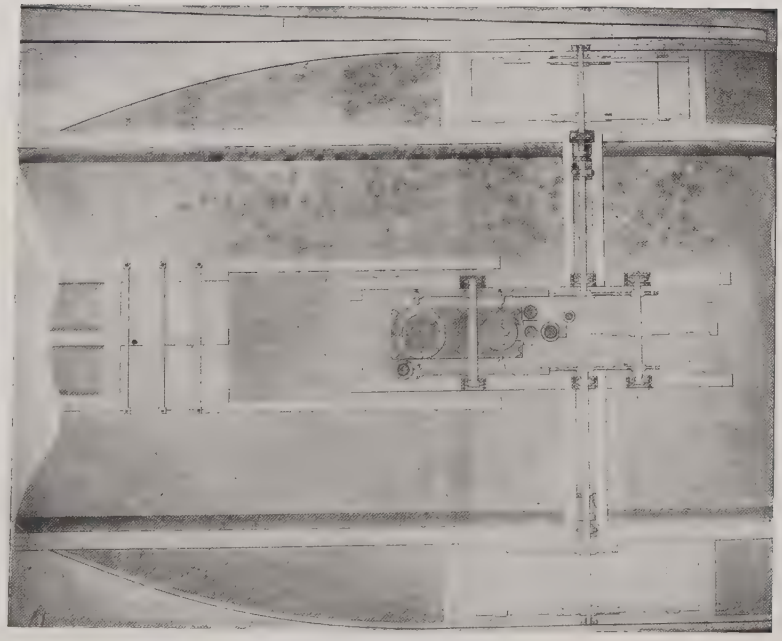
8 feet long and four wide. To enable the boat to be turned more promptly than the rudder could do it, the water wheel shafts were divided at the gunwale of the boat, and there connected with couplings so that the wheel shaft proper could be detached from the crank shaft, and thus either wheel be kept in motion by the engine whilst the other was inoperative.

In the *Clermont* the fly wheels were hung outside of the hull and just in front of the water wheels. Upon one occasion, when by accident both the water wheels had been destroyed, the engineer had recourse to the expedient of attaching small paddle boards to the rim of the fly wheels by which means the voyage was completed without any great loss of time. This fact I had from a passenger then on board the steam boat.

Colden's Life of Fulton together with The Annals of Albany by J. Munsell Vol. VI. published in 1855, furnish a very full account of the facts and incidents of this first successful effort at Steam Navigation.

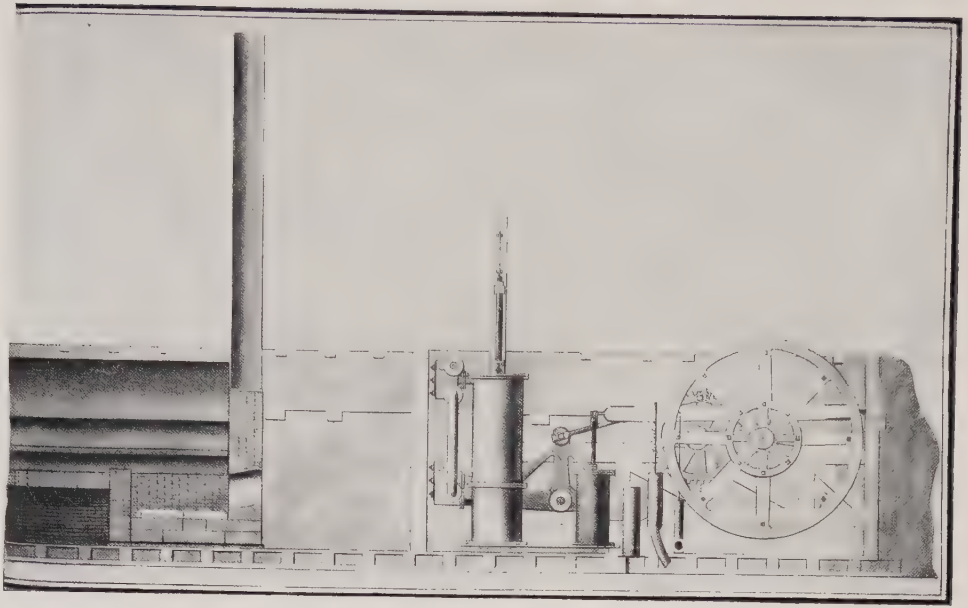
Rich Varick De Witt

Albany, Oct. 28th 1858.



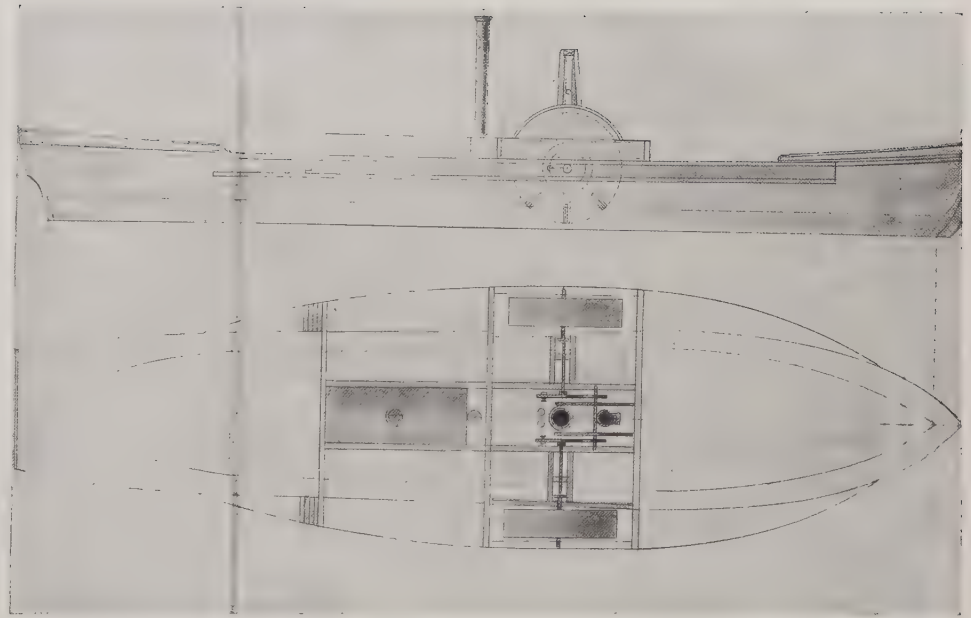
A. FULTON'S PLAN OF THE MACHINERY OF THE *NORTH RIVER*
(THE REMODELED *CLERMONT*)

From the original in the New Jersey Historical Society. Now first published



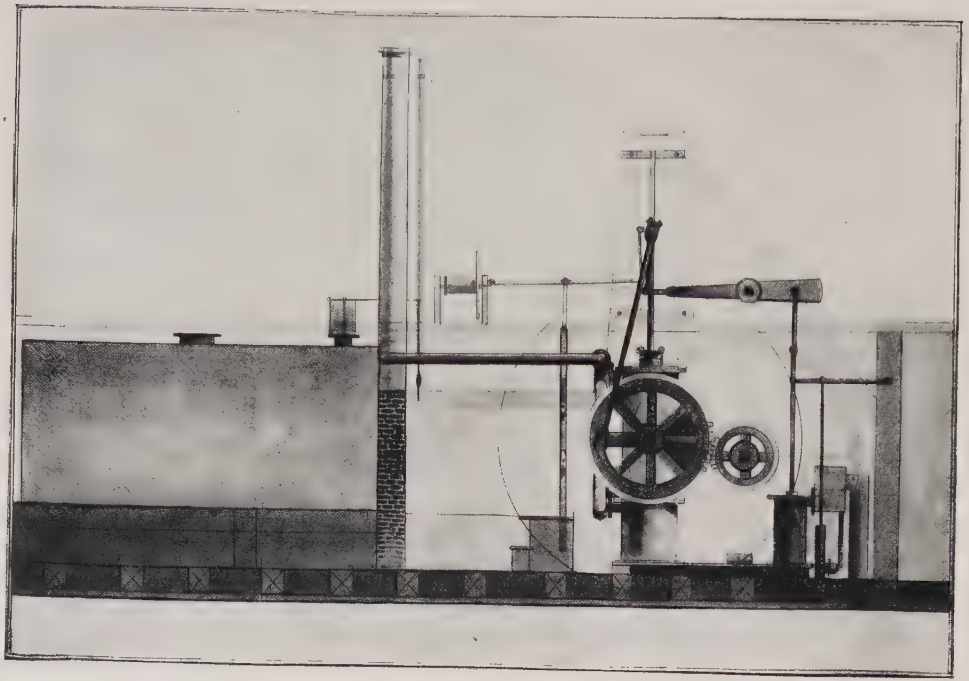
B. FULTON'S ELEVATION OF PLAN *A*

From the original in the New Jersey Historical Society. Now first published



C. FULTON'S PLAN OF A LATER STEAMBOAT, SHOWING APPLICATION OF THE SQUARE SIDE-CONNECTING-ROD ENGINE, THE INVENTION OF WHICH HE ASCRIBES TO JOHN STEVENS

From the original in the New Jersey Historical Society. Now first published



D. FULTON'S ELEVATION OF PLAN *C*

From the original in the New Jersey Historical Society. Now first published

APPENDIX

THORNTON'S DEPOSITION [1]

The deposition which Fulton asked Thornton to sign was as follows: it is given in full because it so thoroughly defines Fulton's several points of originality:

"William Thornton, Director of the Patent Office of the United States at the City of Washington, in the district of Columbia, being first duly sworn deposeth and saith, That in all essays to navigate boats with steam he has never known a steam boat to be more than 50 tons burthen, until the one built on the Hudson's River by Robert Fulton: That to the best of his knowledge the said Robert Fulton is the first who ever applied a water wheel *on each side of a boat* to be navigated by the power of *steam* and so arranged the water wheels that he can use them in and out of gear so as to try the movements of the engine without working the wheels; or work one wheel at a time; That he, the said Fulton, is the first who put guards round the outside of water wheels applied to a boat, so as to support the outer ends of

[1] In possession of Judge Peter T. Barlow.

the axels of said wheels and guard them from injury by vessels Wharves & having formed the guards he consequently is the inventor of every convenience which the guards afford, such as Steps from the stern end of the guards to enter the row boats, Space in and on guards for carrying fuel, bins in the guards for various materials, Coverings to the Water wheels to prevent their entangling in ropes or throwing water on deck to the annoyance of passengers; Conveniences such as water closets on the fore part of said wheel guards for passengers— That the said Fulton is the first who has so arranged the rudder of his Steamboat as that the pilot may stand near the centre of the boat and near the engineer to give him orders when to stop or put the engine in motion. That the said Fulton is the first who has combined a *Gib fore sail top Sail* studden Sails and Square sail with a steam engine to drive a boat[1] and placed his Masts one before the machinery and

[1] [Fulton's note.] Thornton says he had or intended to put sails to a steam boat which was to go round from Phila. to New Orleans; it was however never done and is one of his embrio and useless Ideas. Insist on this. The boat was 20 tons.

the other so far aft as to leave a convenient Space between the two for spreading an awning for the comfort of the passengers and which space is not interrupted by booms or ropes such as annoy passengers in the usual boats which navigate by wind only. The said Robert Fulton is also the first who has, to his knowledge, used triangular beams in the body of his boat to communicate the power from the piston rod to the Water wheels and work his air pump. And John Stevens, Esq. of Broadway in the City of New York, is the first to the best of his knowledge, who has communicated the power from the piston rod to the water wheels by means of crank wheels and shackle bars which work on each side of the Cylender.

The said William Thornton also deposeth and saith that to the best of his knowledge there is no steam boat now in actual and permanent operation anywhere in Europe, nor ever has been; all attempts of the kind in Europe have been merely experiments which, failing of any useful result, have been abandoned as useless.

(Signed)

Now, my friend, [Barlow] all this is fact which you will insist on with Thornton and tell him if pirates can thus copy me he has no chance at any time."

Apparently the deposition was not signed, for Barlow wrote to Fulton the following month, apropos of Thornton:

"The poor fellow can depose nothing now unless it be his bones. He has not recovered from his fever & it is thought by some that he never will. He has not been out of the house since the day he made the other deposition. I called and took him out that morning in my carriage before breakfast and kept him at the judge's till eleven o'clock when I sent him home.— It seems he was sick with the fever when I took him out, tho' I did not know it. I leave your papers for him with Cutting who promises to make him attend to it as soon as possible. Latrobe, as I told you, is very anxious to aid you in establishing the originality and high importance of your invention."

APPENDIX

PAINTINGS BY ROBERT FULTON

Compiled by Alice Crary Sutcliffe for the Official Art Catalogue of the Hudson-Fulton Commission Celebration, Metropolitan Museum of Art

Samuel Beach (miniature); owned by H. A. Boardman, St. Paul, Minnesota.

John Wilkes Kittera (miniature); owned by Pennsylvania Historical Society.

Mrs. John Wilkes Kittera (miniature); owned by Pennsylvania Historical Society.

Clementina Ross (miniature); owned by Pennsylvania Academy of Fine Arts.

Margaret Ross (pastel, 1787); owned by Mrs. C. S. Bradford, Philadelphia.

Benjamin Franklin (oil, 1787); bought in 1891 by C. F. Gunther, of Chicago.

Portrait of a Young Gentleman; mentioned in Royal Academy Catalogue, 1791.

Portrait of Two Young Gentlemen; mentioned in Royal Academy Catalogue, 1791.

APPENDIX

Portrait of a Lady (Mrs. Murray); mentioned in Royal Academy Catalogue, 1793.

Lady Jane Grey (fancy picture); mentioned in Smith's "Catalogue of Portraits" as having been painted about 1793.

Louis XVI in Prison taking Leave of his Family; known through Sherwin's engraving, of which only three prints are known to exist.

Family of Benjamin West; mentioned in Colden's "Life of Robert Fulton," but present whereabouts unknown.

Illustrations for Barlow's "Columbiad"; reproduced in Reigart's "Life of Fulton."

"Incendie de Moscow" (panorama).

Joel Barlow (oil); owned by Judge Peter T. Barlow, New York City.

Joel Barlow (oil); owned by Robert Fulton Ludlow, Claverack, New York.

Robert Fulton (oil, 1795); owned by Mrs. Robert Fulton Blight, New York.

Portrait of Charlotte Villette (1802); mentioned in "Life and Letters of Joel Barlow," by C. B. Todd.

APPENDIX

Colonel Michael McCurdy (miniature); owned by Mrs. George McHenry, Philadelphia.

Joseph Bringhurst (oil, 1786); owned by Edward Bringhurst, Wilmington, Del.

Mrs. Joel Barlow; mentioned in letter of Barlow to Fulton (1800).

Abraham Baldwin, U. S. Senator; a drawing of this portrait appears in the Centennial volume of Washington's Inauguration. It was made by Emanuel Leutze, after the original.

Earl Stanhope (oil); owned by Herman Livingston, Catskill Station, New York.

John Livingston (oil); owned by Robert Fulton Ludlow, Claverack, New York.

Miniature of —— Cunningham; owned by Mrs. Stevens, widow of Bishop Stevens of Pennsylvania.

Mrs. Walter Livingston (oil), mother of Mrs. Robert Fulton; owned by Mrs. Hermann H. Cammann, New York. The portrait is painted on wood, and upon the back is an unfinished portrait of Barlow Fulton, only son of Robert Fulton.

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